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A Study of Teachers Using 21st Century Tools in a Rural South Carolina School District

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Approval Page

This dissertation was submitted by Amanda Elmore Moss under the direction of the persons listed below. It was submitted to the Gardner-Webb University School of Education and approved in fulfillment of the requirements for the degree of Doctor of Education at Gardner-Webb University.

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Abstract

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Students currently live surrounded by technology and the tools of the 21st Century, but as Prensky (2008) asserted, students feel like they "have to power down" when they go to school by working without many of the technology tools with which they are comfortable and by changing, even slowing, their ways of thinking (p. 42). One purpose of this study was to evaluate the technology tools used by students and the quality or types of usage by teachers and students as defined by the recommendations of the Partnership for 21st Century Skills in a rural school district. The study also examined the barriers and supports, as well as training, which impact teacher and student usage within curriculum.

A survey was completed by 217 administrators, teachers, and business persons. The data analysis from the completed surveys reveal that (a) when referring to computer usage, the impact of 21st Century Technology Tools training on the frequency of use in the classroom is clearly very substantial; (b) 21st Century Technology Tools have an elevated impact on the context for learning; (c) the district's technology plan, which included five Technology Dimensions, showed success at different levels while changes in technology availability and budget cuts hindered some successes; and (d) the top five responses from the teachers that responded listed access, utilization, or support staff as advantages in their use of technology. The top six responses from the teacher that responded listed the following as barriers to their use of technology: access, time, funding, or professional development. The qualitative data from focus groups confirmed the survey results. The combined data provided a framework to build professional development within the district.

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Chapter 1: Introduction

In 1996, David Rushkoff wrote a book entitled *Playing the Future* that referred to children as natives to cyberspace and adults as immigrants. Teachers were included in that group of immigrants. The book stated the students of today believe that "multitasking is a way of life" (Cramer, 2007, p. 129) and are increasingly more technologically savvy than the teachers who are teaching them the skills required to move into the job market and beyond. Prensky (2008) believed, "it's their after-school education, not their school education, that's preparing our kids for their 21st century lives—and they know it (p. 41)." Thus it is concluded that teachers, school districts, and communities must find ways to incorporate the use of 21st Century Skills into the lives of 21st century learners. This must occur in order to further knowledge in the classroom as well as in the nation.

This chapter will be an introduction to the study and will include the nature of the problem, the purpose of the study, research questions, and definitions of terms.

Nature of the Problem

The world is changing rapidly due to advances in technology. These changes have created a "global economy" and have set high expectations for an educational system that "is not keeping pace" (U.S. Department of Education [USDE], 2008). According to an article put out by the National Coalition for Technology in Education and Training (1997), "Technology not only helps learners master and apply appropriate academic skills, but also it helps them acquire new skills related to the use of technology itself" (p. 2). The CEO Forum on Education and Technology (2001a) stated the belief that success by students in the digital age depended on the development of 21st Century

Skills. The rural school district in South Carolina focused on in this study had little to no technology data in relation to 21st Century Skills.

Background and Significance of the Problem

In a span of just 30 years, the "modern workplace" has changed significantly and continues to change (Alliance for Excellent Education, 2008). In 2003, the Business-Higher Education Forum found that the label "unskilled" was attached to 80% of jobs. The workforce has changed substantially since then with 85% of jobs being labeled "skilled" (p.13). According to an overarching study involving the US departments of Commerce, Education, and Labor, America's "workers will need to be better educated to fill new jobs and more flexible to respond to the changing knowledge and skill requirements of existing jobs" (Stuart, 1999, p.6).

In 1997, Education Week (in collaboration with the Milken Exchange on Education Technology) identified a need for and created a report that would chart school technology in the United States annually (Technology Counts, 1997). This report continued to chart the state of school technology in the 50 states. The report included three major components for grading: access to technology, use of technology, and capacity to use technology (Technology Counts, 2007). As of 2009, South Carolina ranked 17th in the country by Technology Counts for Access to Technology which included: a) the percent of fourth grade students with access to computers, b) the percent of eighth grade students with access to computers, c) the number of students per instructional computer, and d) the number of students per high-speed Internet-connected computer (Technology Counts, 2009). South Carolina ranked sixth in the country by Technology Counts 2009 for the Use of Technology (Technology Counts, 2009). The

Use of Technology was designed to determine if: a) the student standards included technology, b) the state tested students on technology, c) the state had established a virtual school, and d) the state offered computer-based assessments (Technology Counts, 2008). South Carolina ranked 38th in the Capacity to Use Technology by the same Technology Counts 2009 report (Technology Counts, 2009). The Capacity to Use Technology was determined by whether or not the state included technology in its teacher standards, in its administrator standards, in its initial teacher license requirements, in its initial administrator license requirements, in its teacher recertification requirements, and in its administrator recertification requirements (Technology Counts, 2008). When looking at all four factors, South Carolina improved overall from a grade of C- in 2006 to a B in 2009. The Capacity to Use Technology was where the state fell short with a grade that fluctuated between a B- and a C. Table 1 lists the grades for South Carolina in the past four Technology Counts reports.

Table 1

Technology Counts Grade Results for South Carolina

Technology Counts Category	2006	2007	2008	2009
Access to Technology	75 (C)	81.3 (B-)	80 (B-)	80 (B-)
Use of Technology	69.3 (D+)	79.5 (B-)	79.5 (B-)	100 (A)
Capacity to Use Technology	72.7 (C)	79.5 (B-)	79.5 (B-)	72.7 (C)
Overall Technology Score	72.3 (C-)	80.1 (B-)	79.7 (B-)	84.2 (B)

Note. Per Technology Counts (2006-2009)

South Carolina's State Superintendent of Education prefaced the 2009-2013 South Carolina State Technology Plan with these words:

> The future vitality of our state's economy depends upon the ability of South Carolinians to use computers and digital information systems, and to adopt and adapt to an "information age." Key to stimulating this

> economic development is a K-12 education system that has a focus on digital information systems and 21st Century Skills….We must ensure that South Carolina's students and educators are technologically proficient. We must also make data-driven decisions that promote continuous improvement in education. (SCDE, 2009, p. ii)

The district that was the focus of this study had a technology plan that spanned the 2005-2006 to the 2009-2010 school years and contained 21 measurable goals that were scheduled for evaluation in January of each year. The data components were evaluated for budgetary purposes but not for fulfillment of the technology plan. The district's technology plan expired at the end of the 2009-2010 school year. The plan was based on five technology dimensions that included learners and their environment, professional capacity, instructional capacity, community connections, and support capacity (SCDE, 2009). The evaluation of the district in terms of 21st Century Skills was utilized in this study and in the creation of the new 5-year technology plan for 2010-2015.

Purpose of the Study

The purpose of this study was to evaluate the technology tools used by students and the quality or types of usage by teachers and students as defined by the recommendations of the Partnership for 21st Century Skills in a rural school district. Secondly, the study examined the barriers and supports, as well as training, which impacted teacher and student usage within the curriculum.

Research Questions

The research questions were as follows:

1. What was the impact of 21st Century Technology Tools training on the frequency of use in the classroom?
2. What was the impact of 21st Century Technology Tools on the context for

learning?

3. Has training for Technology Skills been implemented as planned?
4. What were the barriers and supports to implementation of 21st Century Skills?

Definition of Terms

21st Century Skills were defined by four main themes according to the Metiri Group (2003):

I. Digital Age Literacy—Today's Basics

a) Basic, Scientific, and Technological Literacies

b) Visual and Information Literacy

c) Cultural Literacy and Global Awareness

II. Inventive Thinking—Intellectual Capital

a) Adaptability/Managing Complexity and Self-Direction

b) Curiosity, Creativity, and Risk-taking

c) Higher-order Thinking and Sound Reasoning

III. Interactive Communication—Social and Personal Skills

a) Teaming and Collaboration

b) Personal and Social Responsibility

c) Interactive Communication

IV. Quality, State-of-the-art Results

a) Prioritizing, Planning, and Managing for Results

b) Effective Use of Real-World Tools

c) High Quality Results with Real-World Application

21st Century Context was achieved when teachers: (a) made curricular content relevant to

students' lives; (b) took the students out to the world; (c) brought the world into the classroom; (d) or created opportunities for students to interact with each other, with teachers, and with other knowledgeable adults in authentic learning experiences (CareerSmarts, n.d.).

21st Century Content, as defined by CareerSmarts (n.d.), contained three main categories that included the following:

I. Global Awareness
    a) Using 21st Century Skills to understand and address global issues
    b) Collaborating with other cultures and languages

II. Financial, Economic, and Business Literacy
    a) Understanding the role of the economy—macro and microeconomics
    b) Adapting with the nation's economic environment using 21st Century Skills

III. Civic Literacy
    a) Knowing how to be an informed and participatory citizen
    b) Using 21st Century Skills to responsibly exercise rights and responsibilities at local, state, national and global levels

21st Century Tools were defined as information and communication technologies such as computers, networking, and other technologies that included audio, video, and other media and multimedia tools (CareerSmarts, n.d.).

21st Century Learners were people born in or after the 1980s who were the first to use the Internet. They were also sometimes called "millennials" who were so categorized because of their ability to "adapt and respond to rapid and multiple stimuli" (McCoog,

2008, p. 2).

Professional Development was "the term that educators use to describe the continuing education of teachers, administrators, and other school employees" (Department of Public Instruction, 2004, p. 4).

Technology Integration was explained as:

> the incorporation of technology resources and technology-based practices into the daily routines, work, and management of schools. Technology resources were defined as computers and specialized software, network-based communication systems, and other equipment and infrastructure. Practices included collaborative work and communication, Internet-based research, remote access to instrumentation, network-based transmission and retrieval of data, and other methods. This definition was not in itself sufficient to describe successful integration: it was important that integration be routine, seamless, and both efficient and effective in supporting school goals and purposes. (National Forum on Educational Statistics, 2002, p. 75)

Technology Literacy was defined (in The Intellectual and Policy Foundations of the 21st Century Skills Framework) as the ability of a student to use technology in order to acquire knowledge independently. Also included in this definition was the student's ability to efficiently and effectively access information, critically and competently evaluate information, and accurately and creatively use information (Partnership for 21st Century Skills, n.d. a).

Media Literacy was known as the ability to use "the process skills of awareness, analysis, reflection, and action to understand the nature of media messages" (Partnership for 21st Century Skills, n.d. a, p. 5).

Information Communication and Technology (ICT) Literacy was determined to be the ability to skillfully use information resources and understand technological "grammar" (Partnership for 21st Century Skills, n.d. a, p. 20)

Summary

The amount of technology available to students, teachers, classrooms, and communities as a whole is constantly growing. Schools must be capable of teaching and using new forms of technology. Through this study, the researcher provides an understanding of the use of 21st century teaching skills as well as the training of district professional and paraprofessional personnel that was required in a rural school district.

Chapter 2: Review of Related Literature

Introduction

Public education as we know it began in small, one-room school houses where children of all ages learned together. School primers were the textbooks of choice. The teacher stood in front of the class and presented the students with information based on knowledge that he or she had acquired during the course of his or her education. The students then learned life or job skills from their parents or through apprenticeships. As is the nature of history, the educational cycle has come full circle. 21st century learners now go to school and are presented with information based on the knowledge that their teachers acquired during their schooling. At home, the students become their own teachers; they are constantly teaching themselves the skills they will need in the future through the use of technology. McCoog (2008) said, "21st century learners have taught themselves to network and find solutions. Because of this, they expect to have the same experience at school (p. 1)." Students now feel as if they "have to power down" everything when they go to school, including their brain (Prensky, 2008, p. 42).

This chapter served as a review of literature as it pertained to 21st Century Skills used by teachers for the advancement of students knowledge. The chapter included changes in education, context for learning in schools, 21st Century Skills, and training and professional development.

Changes in Education

The educational system in the United States began with colonial schools. By the end of the 1700's, Americans were looking for an established educational guide. In 1796, a prize was offered by the American Philosophical Society for the best educational

plan (Educational Policies Commission, 1955). Following the Revolution, the rise of commerce and industry began to affect the educational system. By 1890, a free public education was provided in every state. It was soon followed by a compulsory attendance law in every state established in 1918 (Educational Policies Commission). The nation's disappointment over the Russian launch of Sputnik in 1957 brought the educational needs of the nation's youth to the eyes of the public. In 1983, the National Commission of Excellence in Education submitted *A Nation at Risk* and declared that "our society and its educational institutions have lost sight of the basic purposes of schooling" (USDE, 2008, p. 1). The study found that "13 percent of 17 year-olds were functionally illiterate, SAT scores were dropping, and students needed an increased array of remedial courses in college" (USDE, 2008, p. 1). This caused several changes within the educational system in order to remove the "complacency" label that *A Nation at Risk* had established. In 1994, Edward M. Kennedy said, "we must design a new blueprint for education, a plan for the future that specifies what students need to know, when they need to learn it, and what we need to do to help them" (Wilson, Miles, Baker, & Schoenberger, 2002, p. 8). The plan to which Kennedy referred was *Goals 2000,* which was passed in 1994 and amended in 1996. The objective of *Goals 2000* was to "to improve student learning through a long-term, broad-based effort to promote coherent and coordinated improvements in the system of education throughout the nation at the state and local levels" (Office of Elementary and Secondary Education, 1998). Standards-based reform spread through the nation in order to implement *Goals 2000,* which was a plan that consisted of eight goals (Office of Elementary and Secondary Education, 1998). The Technology Literacy Challenge (TLC) was implemented by the President and Congress

after the Telecommunications Act of 1996 and the Improving America's Schools Act. The TLC contained five goals that were designed to push young Americans to be technologically literate by the turn of the century and that were analyzed by the National Coalition for Technology in Education & Training (1997). The goals were as follows: Goal 1-professional development, Goal 2-access to technology, Goal 3-connectivity to the information superhighway, Goal 4-technology-based learning resources, Goal 5-coordinated support for implementation of technology in education.

The No Child Left Behind Act of 2001 (NCLB, 2002) was introduced in January of 2002 by President Bush. NCLB brought about numerous challenges within many schools, districts, and states, as well as the nation. As found in the Act, these challenges included but were not limited to the following: "all students have highly qualified teachers and be given the opportunity to attend high quality schools", and "states must raise academic achievement levels for all students" (Simpson, LaCava, & Graner, 2004, p. 67). The NCLB Act addressed technology 204 times within its 1426 pages. This served as a means for getting young people ready for the 21st century. Researchers suggested that technology integration in rural schools might be a means to overcome the challenges of the 21st century including "the relationship between technology and uneven economic development, social class, and racial and ethnic inequities" and "what goes on in the classroom" (Collins & Dewees, 2001, pp.1-2).

The American Recovery and Reinvestment Act (ARRA) of 2009 was passed by Congress on February 13, 2009. Four days later President Obama signed it into law. The three goals of the Recovery Act were in direct response to economic crisis. They were to: (a) create new jobs and save existing ones, (b) spur economic activity and invest in

long-term growth, and (c) foster unprecedented levels of accountability and transparency in government spending. (The Recovery Act, n.d.). The economy continued to spiral downward causing hardship within districts. A study sponsored by the American Association of School Administrators was released April 2010. In the study, 453 school administrators responded to a survey given in March 2010. The study found that economic recovery taking place nationwide is not represented in the educational system; instead, "the latest survey findings document the continued erosion of fiscal resources available to school districts and demonstrate that, across the board, school budget cuts are noticeably more significant for 2010-11 than they were in 2008-09 or 2009-10" (Vogt, 2010). The budget cuts span all areas in districts including technology. Technology itself is usually a very lean budget before budget cuts. McGarvey (2010) said it best:

> It's a riddle faced by virtually every IT director: how to fulfill users' desire for more muscular computing resources while still obliging administrators' commands to keep education spending down. Meanwhile, taxpayers and their representatives demand accountability and frugality. As a result, every budget commitment has to be thought out and targeted, and must come with a few built-in risks. (p. 32)

Through ARRA, districts and states must compete for grants to receive extra funding. In August 2010, Clearwater High School of Florida was the first school in the world to offer their entire student body, over 2,000 students, a portable e-book reader instead of textbooks. This was a total cost savings of $620 when you account for $177 for the Kindle, $120 textbook savings, and $500 savings for access to over 100 novels (Prest, 2011).

Context for Learning in Schools

In the 1930's, schools began to use radios in the classroom. Since that time, the use of technology in the classroom has increased exponentially (Collins & Dewees,

2001). London and Draper (2008) referred to this as "a silent revolution going on…in the delivery system, i.e., the way information is conveyed and the manner in which students learn" (p. 221). Because of this, teachers needed to be prepared to present and use the available technology in a way that better met the needs of their students. According to Holbrook (2010), "education cannot be developed in a vacuum. It needs context…" (p. 6). Such advancements required great changes in school districts across the country so that they could keep up with other schools, other districts, other states, and even other countries, in order to continue to serve students. This sentiment was best expressed by Jack Welch, former CEO of General Electric. He said, "If the rate of change inside an institution is less than the rate of change outside, the end is in sight" (Thornburg, 1997, p. 6). Schools needed to rapidly catch up with technology as it was used in business and industry; otherwise, they would suffer the fate of the businesses who were crumbling due to the economic difficulties. The training of teachers for effective technology use was pushed for the first time in the early 1990's (USDE, 2000). In 1994, 35% of schools were connected to the Internet as compared to 99% in 2001 (EDC, 2003). Connection was not the key to advanced education; teachers needed to use these 21st Century Skills in their classrooms. In 2002, the U.S. Department of Commerce released a study called *A Nation Online* that stated that "American children who lack access to computers and the Internet at home are relying on wired schools and libraries for access" (EDC, 2003, p. 9). Bill Gates, the founder of Microsoft, had previously stated that "the American high school is obsolete…If we keep the system as it is, millions of children will never get a chance to fulfill their promise" (Jobs for the Future, 2005, p. 1). In 2008, the United States was ranked 18th out of 23 industrialized countries in quality and quantity of

education. This was a monumental backslide from first position 30 years previous (Alliance for Excellent Education, n.d.). The Business Roundtable stated that "The United States is the only Organization for Economic Cooperation and Development (OECD) country with a younger generation that has a lower level of high school or equivalent achievement than the older generation" (2009, p. 12). Technology was considered the means to bridge this gap and bring the United States back to the top. But in order for 21st century learners to succeed, access to technology was a necessity. McCoog (2008) explained that the 21st century learner was growing up in a "technology-driven world" that required that students teach themselves in order to compete (p. 2). These learners wanted a comparable school environment. Schools made an attempt to increase the use of technology in classrooms by increasing the number of computers. This was aimed at increasing the amount of access for students. However, the problem remained that the use of technology was primarily "lower-level, productivity-type tasks such as word processing, e-mail, basic Internet search, and electronic presentations" (Overbaugh & Lu, 2008, p. 43). The role of teachers in the 21st century necessitated change. Prensky (2008) predicted, "Teachers would no longer be the providers of information but instead would be the explainers, the context providers, the meaning makers, and the evaluators of information that kids find on their own (p. 42)." Edelson (2010) stated that "knowledge structures depend on the context in which the learning takes place" (p. 357). Teachers should teach 21st century learners how to broaden knowledge and skills through adaptation. These learners must be able to learn, unlearn, and relearn skills in different formats. This must happen in order for workers of the future to succeed in a world where the job skills learned in school become "obsolete

within three to five years" (Partnership for 21st Century Skills, 2002, p. 9).

Computers began in administrative services in schools and are now considered a required part of the necessary educational materials in the classroom (Akengin, 2008). In addition, the testing arena has been "revolutionized" by the introduction of computers (Data Recognition Corporation [DRC], 2007). London and Draper (2008) predicted that "rapid advancements will produce powerful new learning environments and experiences using such new tools as simulation, visualization tools, virtual environments, personal intelligent tutors, vast digital libraries, and interactive museums" (p. iii). Lemke (2002) listed five ways that technology could add value to learning. The five ways were through real-world contexts for learning, connections to outside experts, visualization and analysis tools, scaffolds for problem solving, and opportunities for feedback, reflection, and revision.

In 1994, 49% of United States' public schools had Internet access with the number swiftly moving to 100% by 2000 (Wells & Lewis, 2006). Wells and Lewis also identified the number of secondary public school instructional rooms with Internet access as 4% in 1994 and as 95% by 2005. The number and availability of computers has also increased. Computer use and the integration of technology were plagued with barriers. The research studies classified these barriers into four main categories: access, staff development, leadership, and teachers' personal factors.

Access referred to physical access to a computer as well as lack of access due to time constraints. Access also referred to the availability of the teacher's individual computer and the school's computer labs. Other problems with access were identified in 1997 by Chiero as aging equipment, incompatible software, and computer breakdowns.

Other non-instructional criteria included the capability to run appropriate software, to connect to the Internet, to run reliably, and to find a convenient location in the classroom.

In an article on technological integration regarding policy and curriculum reform, "It is argued that for successful technology integration, there needs to be a shift in pedagogical approaches and reform of teacher education programs" (Vrasidas & McIsaac, 2001, p. 1). In 2005, Ertmer stated that veteran and novice teachers alike have limited experience and understanding about how technology should integrate into educational settings in order to assist with teaching and learning. In 2002, Haughey stated that professional development initiatives should be ongoing. For this reason, when a district purchased new hardware/software for school teachers, it was required to be equipped with the proper instructions in order to use it safely, effectively, and relatively often.

In order for technology integration in schools to be successful, the leadership of the nation, the state, the district, and the individual school was required. Ultimately, school leaders were responsible for enforcement of mandates or policies. Educational programs at colleges and universities were responsible for teacher training. This placed professors in the role of leadership. Even peer or mentor teachers served as instructional leaders to encourage technology integration in new teacher classrooms. The key to technology integration was positive reinforcement from the persons in the leadership roles. Strong district restrictions, poor scheduling, and large workloads were some of the mistakes that those in leadership roles have made in past attempts (Shamburg, 2004).

The crucial factor for the integration of technology in the classroom was the teacher (Bitner & Bitner, 2002). The teachers' motivations to use computers were

affected by appropriate training through professional staff development, supportive leadership, and access to plan and to present information. Personal factors, however, also had an effect on technology use. Two main personal factors existed in terms of technology use in the classroom. First, a teacher who was comfortable using a computer was more likely to incorporate it into lessons. Second, a teacher who believed that the use of computers would improve their instruction was more likely to use it. Brinkerhoff (2006) identified four barriers that impacted technology integration. The barriers were "resources, institutional and administrative support, training and experience, and attitudinal or personality factors" (Brinkerhoff, 2006, p. 22).

Technology plans were introduced in an effort to guide states and school districts through the use of technology. School districts throughout the nation implemented technology plans. These plans could be for the school district, or individual plans could be developed for each school. The plans set long term goals, which included budgeting and implementing timelines that usually lasted several years. The purchase of hardware and/or software, networking, network maintenance, furniture, wiring, equipment, and staff development were included in the budget. Each technology plan was (and is) continuously updated as technology advances and changes. Professional/staff development was also included within technology plans in order to accomplish teacher success. Each district was allowed the opportunity to create an original plan belonging to the district or to model a plan after the state plan. The technology goals and dimensions for the state of South Carolina were as follows:

1. Learners and Their Environment which "relies on strategies to enable students to meet the state's high academic standards and master core 21st Century Skills. The

environment should be one of shared learning and should be designed to enhance student academic achievement through scientifically based learning practices and modern technologies" (SCDE, 2009, p.2).

2. Professional Capacity which "emphasizes strategies to develop ongoing and sustained professional development programs for all educators—teachers, principals, instructional technology personnel, guidance counselors, school library media personnel, and technical staff" (SCDE, 2009, p. 2).
3. Instructional Capacity which "targets the development of strategies to integrate technology into curricula and teaching and also explores ways to promote teaching methods that are based on solid and relevant scientific research" (SCDE, 2009, p. 2).
4. Community Connections which "supports the development of partnerships and collaborative efforts to provide technology-related activities and to maximize community involvement in education in ways that will increase student achievement and teacher technology proficiency" (SCDE, 2009, p. 2).
5. Support Capacity which "underscores the necessity of physical and staff infrastructure and supporting resources such as services, software and other electronically delivered learning materials, and print resources in order to ensure efficient and effective uses of technology" (SCDE, 2009, p. 2).

For the purpose of this study the context for learning was measured by looking at 21st Century Content and the integration of technology.

21st Century Skills

The Partnership for 21st Century Skills was formed in 2002 and consisted of

public and private members as listed in Table 2 (Partnership for 21st Century Skills, 2002).

Table 2

Original Members of the Partnership for 21st Century Skills

Members	Key Partners	Strategic Partners
-AOLTW Foundation -Apple Computer, Inc. -Cable in the Classroom -Cisco Systems, Inc. -Dell Computer Corporation -Microsoft Corporation -National Education Association -SAP	-U.S. Department of Education -Appalachian Technology in Education Consortium	-ISTE -Consortium for School Networking -SETDA -Tech Corps

The mission of the Partnership for 21st Century Skills was to "serve as a catalyst to position 21st Century Skills at the center of United States K-12 education by building collaborative partnerships among education, businesses, communities and government leaders" (n.d.a, p. 6). In essence, the program's goal can be understood from the following mission statement:

> "The Partnership for 21st Century Skills is a national organization that advocates for 21st century readiness for every student. As the United States continues to compete in a global economy that demands innovation, P21 and its members provide tools and resources to help the U.S. education system keep up by fusing the three Rs and four Cs (critical thinking and problem solving, communication, collaboration, and creativity and innovation)." (Appendix C)

The Partnership for 21st Century Skills (2009) designated key elements for 21st century learning in the P21 Framework that was incorporated into a graphic (Appendix D) that represents the framework. These elements were divided into two categories: student outcomes (as represented in a rainbow) and support systems (as represented in pools). The four student outcomes were defined as follows:

1. Mastery of core subjects and 21st century themes-Core subjects included English, reading or language arts, world languages, arts, mathematics, economics, science, geography, history, government and civics. 21st century themes included global awareness, financial, economic, business and entrepreneurial literacy, civic literacy, and health literacy.
2. Learning and Innovation Skills-This included a focus on creativity, critical thinking, communication, and collaboration.
3. Information, Media, and Technology Skills-This element included information literacy, media literacy, information, communications, and technology literacy (ICT).
4. Life and Career Skills-Included in this element were flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, and leadership and responsibility.

The four support systems were necessary to ensure student mastery of 21st Century Skills. The support systems included the following information:

1. 21st Century Standards and the assessments of 21st Century Skills.
2. Teaching of a 21st century curriculum and instruction.
3. Professional development that explains ways that teachers can integrate 21st Century Skills into their classroom.
4. The creation of 21st century learning environments. (Partnership for 21st Century Skills, 2009, pp. 1-7)

The information, media, and technology skills element that was the focus of this study included several subcomponents listed below as defined by the Partnership for 21st

Century Skills (2009):

1) Information Literacy

A) Access and Evaluate Information

i. Access information efficiently (time) and effectively (sources)

ii. Evaluate information critically and competently

B) Use and Manage Information

i. Use information accurately and creatively for the issue or problem at hand

ii. Manage the flow of information from a wide variety of sources

iii. Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information

2) Media Literacy

A) Analyze Media

i. Understand both how and why media messages were constructed, and for what purposes

ii. Examine how individuals interpreted messages differently, how values and points of view are included or excluded, and how media influenced beliefs and behaviors

iii. Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of media

B) Create Media Products

i. Understand and utilize the most appropriate media creation tools, characteristics, and conventions

ii. Understand and effectively utilize the most appropriate expressions and interpretations in diverse, multi-cultural environments

3) Information, Communications and Technology (ICT) Literacy

A) Apply Technology Effectively

i. Use technology as a tool to research, organize, evaluate and communicate information

ii. Use digital technologies (computers, PDAs, media players, GPS, etc.), communication/networking tools and social networks appropriately to access, manage, integrate, evaluate and create information to successfully function in a knowledge economy

iii. Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information technologies. (pp. 7-9)

The standards for Information, Media, and Technology Skills have been published by many groups, which included the following listed by Kahl in 2008: the International Society for Technology in Education (ISTE), the International Technology Education Association (ITEA), the American Association of School Librarians (AASL), and the Center for Media Literacy (CML).

According to a US report in 1999, “The nation’s workers will need to be better-educated to fill new jobs and more flexible to respond to the changing knowledge and skill requirements of existing jobs….American competitiveness and worker prosperity

will be tied tightly to the education and skill attainment of the workforce" (Stuart, 1999, p. iii). This required cooperation between the educational system, the workforce, and the community as a whole. The educational system must plant the seed of lifelong learning in each student to create a 21st century learner, because "technology is broadening the scope of when and where learning occurs" (Educause, 2006, p. 4)

The Partnership for 21st Century Skills identified nine steps that communities could use to integrate 21st Century Skills successfully into education. The nine steps were as follows:

1. Embrace a powerful vision of public education that includes 21st Century Skills
2. Align leadership, management, and resources with educational goals
3. Assess where schools are now
4. Prioritize the 21st Century Skills on which to focus
5. Develop a professional development plan for 21st Century Skills
6. Ensure that students have equitable access to a 21st century education
7. Begin developing assessments to measure student progress in 21st Century Skills
8. Collaborate with outside partners
9. Plan collectively and strategically for the future (Partnership for 21st Century Skills, n.d.b, p.1)

This study provided information for decisions to allow the rural school district to jump forward into the 21st century through the establishment of a technology plan that promoted 21st Century Skills in both students and teachers.

Training and Professional Development

The United States Secretary of Education, Arne Duncan (2009) spoke at Columbia University and said, "To keep America competitive, and to make the American dream of equal educational opportunity a reality, we need to recruit, reward, train, learn from, and honor a new generation of talented teachers. But the bar must be raised for successful teacher preparation programs because we ask much more of teachers today than even a decade ago." The way educators were trained began to be studied and analyzed. The strategic council of the Partnership for 21st Century Skills along with an advisory group named The American Association of Colleges for Teacher Education (AACTE) worked collaboratively to develop the following "Core Principles on 21st Century Skills and Educator Preparation":

1. P-12 education will prepare all students with 21st century knowledge and skills.
2. P-12 teachers and administrators will possess, teach and assess 21st century knowledge and skills.
3. Educator preparation programs will prepare their graduates to possess, teach and assess 21st century knowledge and skills.
4. New teachers will be prepared to become change agents for embedding 21st century knowledge and skills in all subjects in P-12 curricula in accordance with national and state standards.
5. Higher education leaders will work with leaders in P-12 and local communities to inform the redesign of educator preparation programs to more effectively meet the needs of 21st century learners.

6. Each educator preparation program will develop a 21st century blueprint for transforming itself into a 21st century program.
7. Educator preparation programs will be recognized as sources of leadership in developing 21st century education and learning strategies.
8. Educator preparation programs will be at the forefront of research and evaluation of 21st century education. (Partnership for 21st Century Skills, 2010. p. 4)

Middle Tennessee State University's Office of Information Technology issued a survey to students and faculty beginning in the spring of 1998 (Lea, Clayton, Draude, & Barlow, 2001). The survey evaluated teaching and learning based on the impact of technology. The results of the study were divided based on student results and faculty results. A follow-up survey was issued 2 years later due to innovations and increased availability of technology. The overall results for faculty were:

1. Faculty believe that instructional technology is essential.
2. Faculty have various needs relating to instructional technology.
3. Instructional technology is widely used across campus.
4. Different instructional technologies accommodate different teaching practices.
5. Faculty use of instructional technology will continue to increase.
6. Faculty feel that their office equipment is adequate (from follow-up study).
7. Faculty feel that technology-based classrooms are important (from follow-up study).

8. Faculty feel that web-based training enhances student learning (from follow-up study). (Lea, Clayton, Draude, & Barlow, pp. 69-70)

The student surveys of the study yielded the following information:

1. The use of instructional technology positively affects student learning.
2. The use of instructional technology increases student interest and satisfaction.
3. Faculty's role and their ability to use instructional technology are major factors.
4. Certain instructional technology techniques better facilitate certain learning activities.
5. Instructional technology is an integral part of today's learning environment.
6. Students perceive instructional technology as an expected part of today's learning environment (from follow-up study).
7. Students perceive the ability of faculty to use technology as an effective teaching tool remains an issue. Specifically, the faculty who lack the proper skills to use—or who misuse—the technology (from follow-up study). (Lea, Clayton, Draude, & Barlow, pp. 69-70)

Willis, Thompson, and Sadera (1999) analyzed research on technology as it pertains to teacher education. The analysis of research revealed "that most teacher-education students have very positive attitudes toward the use of technology in education but are far less confident about their ability to actually use technology" and found "that teacher-education faculty also have positive attitudes toward technology in education, but

many do not feel they have a strong background in actually integrating that into the teacher-education courses they teach" (Willis, Thompson, & Sadera, p. 14). Finally, it was determined that "preparation for preservice teachers in the area of technology" was not adequate (Willis, Thompson, & Sadera, p. 14).

The economic crisis and demands for educational reform caused school leaders nationwide to start critically evaluating technological professional development in terms of "return on investment" (Grimes & Smith, 2004, p. 1). Wolf described professional development as follows:

> Effective teaching and learning does not just happen—it takes high-quality and sustainable professional development. Technology now provides teachers access to abundant professional development opportunities through online courses, professional learning communities, and education portals stocked with resources and lesson plans. This is particularly critical in rural and inner-city areas, where these opportunities are often limited due to barriers of location or funding. (Wolf, 2008, p.26)

Training and professional development were the avenues for teacher learning in school districts throughout the nation. Technology integration depended on correct and relevant training and professional development for teachers. Slepkov (2008) explained that teachers were constantly adding new strategies to their teaching "repertoire" (p.85). A problem was encountered when those teachers did not always make adaptations in their way of teaching in order to use the strategies more effectively. Coffland and Strickland (2004) found that four relationships existed that were statistically significant when looking at teacher use of technology in secondary geometry instruction. These four findings were:

> The demographic variable of the number of geometry sections taught was inversely related to teacher technology use. Teacher attitude toward computers was directly related to principal attitude toward computers. Teacher attitude was also found to be directly related to teacher

> technology awareness. Finally, the type of teacher technology training was found to correlate positively with teacher computer use. (Coffland & Strickland, 2004, p. 355)

NCLB mandated that technology be integrated into the classroom. The state of South Carolina proviso indicated that:

> to ensure the effective and efficient use of the funding provided by the General Assembly in Part IA, Section1 XI.A.1 for school technology in the classroom and internet access, the State Department of Education shall approve teacher technology competency standards and local school districts must require teachers to demonstrate proficiency in these standards as part of each teacher's Professional Development plan. Evidence that districts are meeting the requirement is a prerequisite to expenditure of a district's technology funds. (SCDE, 2010)

The proviso spawned the creation the Teacher Technology Proficiency that required the demonstration of technology proficiency by teachers. The proficiency was tracked by districts based on the following policy:

> Districts must adopt teacher technology standards that are aligned with ISTE standards. Districts must develop a Teacher Professional Development Plan. District Standards and Professional Development Plans must be incorporated or tied to the district technology plan. Districts must submit their revised and current technology plan to the Office of eLearning. School districts will enter teacher technology proficiency dates via the Professional Certified Staff system validating the fact that the teacher is proficient in technology once every 5 years and prior to their 5 year expiration date. All applicable proficiency dates must be entered into PCS by given deadlines or districts could lose valuable technology funding. (SCDE, 2010)

Therefore all full-time personnel who have a Professional Teaching Certificate must obtain technology proficiency. This must be renewed every five years via technology courses or trainings.

Summary

With the rise of technology, students were no longer limited in their learning by an educational setting or location. Castro (2001) explained that the role of teachers

would change from providers of information to facilitators who concentrated “on the teaching of social skills rather than academic or technical expertise” (p. 3). Yet the current literature stated that computers were often not being used for instruction, but rather for daily classroom management tasks. The barriers to technology integration that were stated previously could also affect the use of technology for instruction by teachers. The technology tools used and the quality of usage by teachers and students, as well as information pertinent to technology training, was the byproduct of this study and its parts.

Chapter 3: Methodology

Introduction

The purpose of this study was to evaluate the technology tools used by students and the quality or types of usage by teachers and students in a rural school district, as defined by the recommendations of the Partnership for 21st Century Skills. Second, the study examined the barriers and supports, as well as training, that impacted teacher and student usage within the curriculum.

The research questions presented to the business persons, administrators, and teachers of the rural South Carolina school district were scrutinized in order to analyze the data as it pertained to 21st century technology and skills. The research questions were as follows:

1. What was the impact of 21st Century Technology Tools training on the frequency of use in the classroom?
2. What was the impact of 21st Century Technology Tools on the context for learning?
3. Was training for Technology Skills implemented as planned?
4. What were the barriers and supports to implementation of 21st Century Skills?

In this chapter, the study examined the research design, participants, instruments, procedures for quantitative data collection and analysis, procedures for qualitative data collection and analysis, and limitations.

Research Design

This study was a mixed methods study that contained both qualitative and quantitative methods. Mixed methods studies are used when "the researcher bases the

inquiry on the assumption that collecting diverse types of data best provides an understanding of a research problem" (Creswell, 2003, p. 21). As per Creswell's (2003) recommendations, this study began with "a broad survey" as the quantitative component and then followed with "open-ended interviews" to fulfill the qualitative component (p.21). Both were combined in order to better answer the research questions for the study.

Participants

The participants in this study were the teachers, administrators, district office personnel, selected community members, and business owners in a rural South Carolina school district during the 2009-2010 school year. The participants were sent the survey via an online survey tool.

The participants' email addresses were acquired through the school district's technology department. Once the addresses were available, an electronic message was sent to each participant, which contained the directions and a link to the survey via the online survey tool. Due to necessity, two more emails were sent as a reminder for survey completion.

Quantitative Instrument

The research questions required the combination of three previously tested surveys: (a) *The West Virginia Teacher' Technology Tools and Use Survey* (Clark, 2008); (b) *The Instructional Technology in the Classroom: A Training Needs Assessment* (Smith, 2001); and (c) *The Online Milestones for Improving Learning and Education (MILE) Guide Assessment* (Partnership for 21st Century Skills, n.d.c). The *West Virginia Teacher' Technology Tools and Use Survey* was developed by Deborah D. Clark (2008).

The survey was comprised of open-ended as well as closed-ended questions. The survey focused on the instructional use of technology tools and the supports or barriers to technology use. The survey instrument was developed and validated by the researcher. The researcher used a panel of experts that were "actively using technology for their teaching assignments" (Clark, 2008). The experts were polled and their responses were used to revise the instrument. Permission to use and adapt this instrument was obtained in advance (Appendix A).

The second survey was the *Instructional Technology in the Classroom: A Training Needs Assessment* (Smith, 2001) developed by Sandra J.W. Smith. This survey used closed-ended questions that focused on teacher training experience and teacher training needs. Smith adapted this survey from two previously used surveys. One was from the *Monroe County Community School Corporation* and was used in May 1996, and the other was from the *TEA-AEL Survey of Educational Technology in the Classroom* and was used in 1991. The first was used to develop a training needs assessment. The second survey was used to describe the use of technology in Tennessee County schools. Permission to use and adapt these instruments was granted to the researcher in advance (Appendix B).

In addition, the *Online Milestones for Improving Learning and Education (MILE) Guide Assessment* (Partnership for 21st Century Skills, n.d.c) was added to the survey to assess the current stage of the district in terms of 21st Century Skills. The Partnership for 21st Century Skills (2003) developed the MILE guide through the feedback of researchers, employers, and educators. The creators presented the MILE guide at meetings and conferences, which included a Partnership-organized focus group that

consisted of “teachers, students, administrators, state educational technology directors, after-school program directors and others in the education community” (Partnership for 21st Century Skills, 2003). Feedback was requested from educational leaders to validate the instrument. Permission to use and adapt this instrument was obtained in advance (Appendix C).

The combined instrument was developed by the researcher and called the Technology Tools, Use, and Training Survey (Appendix E). Questions 1 through 9 of the survey were solely for demographic information. Questions 10 through 31 were rating-type questions with three choices. Question 32 was a 3-point Likert Scale question which ranged from No Impact to High Impact. In Questions 33, 34, 35, and 36, the participants responded via a 7-point Likert Scale question ranging from Not at All to Daily. Questions 37, 39, 41, and 52 were open-ended questions. Questions 38 and 40 were checklists for the participants to check all responses that applied to them. Question 43 was a 4-point Likert Scale question ranging from Not Well Informed to Very Well Informed. Question 41 was a rating question with three choices. Question 44 was a 4-point Likert Scales ranging from Very Effective to Never Used. Question 45 was also a 4-point Likert Scales ranging from Very Effective to Never Experienced. Questions 46, 48, 49, and 50 were 4-point Likert Scale questions ranging from Least Preferred to Most Preferred. Question 47 was a 4-point Likert Scale ranging from Most Preferred to Least Preferred. Question 51 was a rating question with four choices.

Procedures for Quantitative Data Collection and Analysis

Permission was granted by the Director of Technology of the school district before the survey was conducted (Appendix F). An email was sent to each participant

explaining the procedures as well as the purpose of this study (Appendix G). The email contained a link to the online survey that participants were asked to take. The survey was to be taken in full by all teachers in the district. Questions 1 through 31 were completed by non-teaching as well as teaching personnel. Questions 32 through 52 pertained only to teachers. One week later, another email was sent as a reminder to all participants (Appendix H). This was followed by a final reminder in the form of an email one week prior to the end of the survey (Appendix I).

All data provided by the respondents was collected anonymously. Babbie (2001) recommended the use of anonymity to protect the identity of respondents, thus raising their comfort level when truthfully answered. Anonymity also ensured against ethical considerations (Babbie).

Research Question 1 was answered by Questions 18, 33, 34, 42, 43, and focus group responses. Research Question 2 was answered by Questions 10-15, 31, 35-37, 51-52, and focus group responses. Research Question 3 was answered by Questions 17, 32, 42-50, and focus group responses. Research Question 4 was answered by Questions 19-22, 24, 27, 38-41, and focus group responses.

Questions 10 through 31 were tallied according to the number of respondents choosing a, b, or c. Responses were categorized into three areas which were: (a) Early stages of 21st Century Skills, (b) transitional stages of 21st Century Skills, and (c) the presence of 21st Century Skills in the district. Questions 18 and 43 were rating-type questions that were combined with Questions 33, 34, and 42 to answer Research Question 1. In Questions 33, 34, and 42, the participants specified how often 21st Century Technology tools were integrated via a 7-point Likert Scale and a 4-point Likert

Scale. Research Question 2 was answered using survey questions 10-15, 31, 36-37, and 51-52, which were a combination of a rating, a 7-point Likert Scale, open-ended questions, and a 4-point Likert Scale. Survey Questions 17, 32, and 42-50 were rating and Likert Scale questions that answered Research Question 3. Research Question 4 was also answered via rating, open-ended questions and checklists through survey Questions 19-22, 24, 27, and 38-41. Upon completion and analysis of the survey data, focus groups were used to further clarify themes that were identified.

Data analysis was performed using statistical analysis software to determine a frequency distribution. Upon completion of the data analysis, the data and a summary of the results was sent to the Director of Technology for the school district in order to write the upcoming District Technology Plan (Appendix J) and to assist in the requisition of training for the teachers in the district.

Procedures for Qualitative Data Collection and Analysis

Qualitative data was gathered from five groups of participants. The groups were assigned to the corresponding technology goals and dimensions of South Carolina that were mentioned previously in detail on page 17 and are listed below:

Group 1. Learners and Their Environment (SCDE, 2009, p.2).

Group 2. Professional Capacity (SCDE, 2009, p. 2).

Group 3. Instructional Capacity (SCDE, 2009, p. 2).

Group 4. Community Connections (SCDE, 2009, p. 2).

Group 5. Support Capacity (SCDE, 2009, p. 2).

Groups 1 through 4 were selected via random selection from the participants of the survey. These groups represented all schools as well as individual school levels. Group

5 was composed of technical individuals familiar with the capacity of the servers, networks, and the interworkings of the district. Groups 1 through 3 were set up as focus group interviews. A full-time teacher enrolled in doctoral studies in Curriculum and Instruction volunteered to conduct the Focus Groups for continuity of delivery and approach as well as neutrality. The interview was recorded via video camera for later transcription into Microsoft Word. Group 4 was composed of a combination of teachers, administrators, and business people from the community. The group members were notified via email of the requirements and asked eight open ended questions. They were instructed to return the completed questions via mail or email. Group 5 had questions posted onto KnowledgeNet or Moodle (a virtual learning environment used by educators) as a group discussion or online focus group. The group was instructed to visit the site often and respond to the reactions of their colleagues. Each group's questions reflected one of the five dimensions into which they were divided. Common themes were identified based on the most prevalent ideas or perceptions. Data from these groups further explained the quantitative data results from viewpoints of the initial survey participants.

Limitations

The limitations were that the study focused on 21st Century Skills for a single district. The findings were not comparable to other districts due to differing economic, cultural, social, and situational influences. The results of the study provided contextual or other information to encourage users to determine how the results or findings could apply in other situations. The accuracy and willingness of the teachers to recognize and report their skills, knowledge, classroom information, and their needs limited the

usefulness of the data. The term access refers to several different types of access in the survey but does not differentiate between the types.

Summary

This study was a mixed methods study that combined both qualitative and quantitative studies. The survey on Technology Tools, Use, and Training was sent to all the teachers in a South Carolina school district during the 2009-2010 school year. The survey was analyzed via statistical software in order to determine means, frequencies, and percentages. Focus groups were then formed and themes were discerned through focus group interviews to better determine the use and further training required for 21st Century Skills as defined by the Partnership for 21st Century Skills.

Chapter 4: Results of the Study

Introduction

The researcher in this study examined the technology tools used by students and the quality or types of usage by teachers and students in a rural school district, as defined by the recommendations of the Partnership for 21st Century Skills. Second, the study examined the barriers and supports, as well as training that impacted teacher and student usage within the curriculum. This chapter explored the four research questions and the data reported in the Technology Tools, Use, and Training Survey. The information provided regarding demographic information begins the chapter. Barriers and supports to the implementation of 21st Century Skills was included in the final paragraph of this chapter.

The Director of Information Management System (IMS) for the selected school district provided the researcher with names and emails for all the teachers (654) and administrators (28) in the district. The researcher requested a list of local businesses and their email addresses from the local Chamber of Commerce. A random numbers table was used to select the sample of local businesses to be surveyed. This narrowed the sample from 285 to 75 at the request of the school district. A total of 758 surveys was sent electronically to the teachers, administrators, and businesses. Three hundred twenty-three surveys were returned, but only 217 were completed. Only the completed surveys were used (188 or 28.7% from teachers, 12 or 42.9% from administrators and 17 or 22.7% from businesses). This resulted in an overall response rate of 28.6% (29.4% overall from teachers and administrators).

An overall evaluation of the district via the MILE guide determined that the

district was in the transitional stage for all three areas. This is portrayed in Table 3 where a response of 1 showed early stages of 21st Century Skills, a 2 displayed transitional stages, and a 3 indicated the presence of 21st Century Skills. Questions 10-18 represented Learning and Teaching. Leading and Managing were represented by Questions 19-25. Finally, Questions 26-31 represented Partnering.

Table 3

MILE Guide Mean Responses

Question	Admin (12)	Business (13)	Teachers (183)	Total (208)
10	1.58	1.86	1.96	1.93
11	1.67	1.54	1.74	1.72
12	1.83	1.77	1.95	1.93
13	2.00	1.92	2.08	2.06
14	1.75	1.69	2.15	2.10
15	1.83	1.83	1.97	1.95
16	1.93	1.92	2.04	2.23
17	1.67	1.83	1.81	2.01
18	1.83	1.54	2.03	1.99
19	2.00	1.77	2.05	2.03
20	1.67	1.46	1.86	1.82
21	2.17	1.54	2.02	2.00
22	1.83	1.67	1.96	1.94
23	1.92	1.77	2.07	2.04
24	1.83	1.25	1.93	1.89
25	1.92	1.33	1.69	1.68
26	1.75	1.42	1.83	1.80
27	1.92	1.33	1.78	1.76
28	2.08	1.54	1.97	1.95
29	1.67	1.31	1.69	1.66
30	1.83	1.31	1.84	1.80
31	2.00	1.88	1.90	1.90

Demographic Information

A very diverse group of teachers, administrators, and members of the business community received this survey. They were all of different ages, educational levels, and experiences. All participants worked in the same county as the participating school

district.

Two hundred-fifteen survey participants responded when asked about their ages (see Table 4). Seven (3%) were 61 years old or older. Sixty-one (28%) participants were between the ages of 51 and 60. The majority, 65 (30%), were between the ages of 41 and 50. A total of 55 (26%) were between the ages of 31 and 40, and 27 (13%) were 30 years of age or younger.

Table 4

Age of Survey Participants

	Admin	Business	Teachers	Total
20-30	0 0 %	0 0 %	27 14.52 %	27
31-40	2 16.67 %	4 23.53 %	49 26.34 %	55
41-50	4 33.33 %	6 35.29 %	55 29.57 %	65
51-60	5 41.67 %	6 35.29 %	50 26.88 %	61
61+	1 8.33 %	1 5.88 %	5 2.69 %	7

The respondents to the survey were asked what role they played in the educational process. The participants were allowed to check multiple roles. The results in Table 5 revealed a diverse group of people who participated in multiple facets of education. The 185 teachers had a respondent in each of the 12 categories. The administrators checked 4 of the 12 categories. Business members checked 6 of the 12.

Table 5

Current Role in Educational Process

	Admin	Business	Teachers
Teacher	0	1	185
Local School Administrator	11	0	1
District Administrator	1	0	1
State Policymaker	0	0	1
Local Policymaker	0	4	2
Business Leader	0	11	2
Parent/Family Member	2	7	28
Higher Education Member	1	0	8
Education Researcher	0	0	2
Content Provider	0	0	5
Member of Youth-Serving Organization (ex. YMCA, Boys and Girls Club, etc)	0	2	7
Member of an Educational Organization or Professional Organization	0	6	25

The District Office for the district of study provided the number of years of experience for administrators and teachers in the 2009-2010 school year as shown in Table 6. Seven (11.67%) administrators had worked for the district for six to 10 years. Nine (15%) worked for 11 to 15 years. Five (8.33%) worked for both 16 to 20 years and 21 to 25 years. Eight (13.33%) worked for both 26 to 30 years and 31 to 35 years. The majority of administrators, 18 (30%), had worked for the district over 36 years.

One hundred forty-six (22.29%) teachers had 0-5 years experience. The majority of teachers, 162 (24.73%) had been teaching for six to 10 years. One hundred eleven (16.95%) teachers had 11 to 15 years experience. Seventy (10.69%) teachers had 16 to 20 years experience. Forty-five (6.87%) teachers had 21 to 25 years experience. Sixty-three (9.62%) teachers had 26 to 30 years experience. Fifty-two (7.94%) teachers had 31 to 35 years experience. Six (0.92%) teachers had 36 years or more of experience.

Table 6

Years of Teaching/Administrative Experience

	Admin	Teachers	Total
0-5	0	146	146
	0.00%	22.29%	20.42%
6-10	7	162	169
	11.67%	24.73%	23.64%
11-15	9	111	120
	15.00%	16.95%	16.78%
16-20	5	70	75
	8.33%	10.69%	10.49%
21-25	5	45	50
	8.33%	6.87%	6.99%
26-30	8	63	71
	13.33%	9.62%	9.93%
31-35	8	52	60
	13.33%	7.94%	8.39%
36+	18	6	24
	30.00%	0.92%	3.36%
Total	60	655	715

Table 7 represents the educational levels of the participants in the study. One (8%) administrator held a masters degree, 8 (67%) held Education Specialist or masters plus 45 hours, and 3 (25%) held a doctoral degree. The members of the business community responded with 2 (12%) having earned a high school diploma, 11 (65%) having earned a bachelors degree, 3 (18%) having earned a masters degree, and only 1 (6%) having earned an education specialist or masters plus 45 hours. Sixty-six (36%) teachers held a bachelors degree, 98 (53%) held a masters degree, 19 (10%) held education specialist or masters plus 45 hours, and 2 (1%) held a doctoral degree.

Table 7

Highest Earned Degree

	Admin	Business	Teachers	Total
High School Diploma		2		2
B.A. or B.S.	0	11	66	77
M.A. or M.S.	1	3	98	102
Ed.S. or +45	8	1	19	28
Ed.D. or Ph.D.	3	0	2	5

Research Question 1

What is the impact of 21st Century Technology Tools training on the frequency of use in the classroom? To determine the impact of 21st Century Technology Tools training on the frequency of use in the classroom, survey Questions 18, 33, 34, 42, 43, and focus group responses were used. The tables present the data in percentages of administrators, business owners, and teachers who responded to the questions. The combined results answered Research Question 1.

Survey Question 18 (Table 8) asked the survey respondent to indicate how professionals use 21st Century Tools. The responses were recorded via a rating-type question. Administrators and teachers (122) gave an average response that 50% or more of teachers consistently integrated the use of 21st Century Tools into the classroom.

Table 8

Professionals Use of 21st Century Tools

	Admin	Teachers
a. 10% or more of teachers consistently integrate the use of 21st Century Tools into the classroom.	3 25.0%	32 17.49%
b. 50% or more of teachers consistently integrate the use of 21st Century Tools into the classroom.	8 66.67%	114 62.30%
c. All teachers act as role models in the application of 21st Century Skills and Tools into the classroom.	1 8.33%	37 20.22%
Total	11	183
Mean Responses	1.83	2.03

Survey Question 33 and 34 (Table 9) asked the participants to specify how often 21st Century Technology Tools were integrated for instructional purposes. A 7-choice Likert response scale (Not at All, Less than Once a Month, Once a Month, Several Times a Month, Once a Week, Several Times a Week, and Daily) was used to record responses. The responses were grouped into categories to narrow the data. Monthly consisted of responses of: Less than Once a Month, Once a Month, and Several Times a Month. Once a Week and Several Times a Week responses were grouped into the category designated as Weekly. The complete graphs can be viewed in Appendices J and K. The majority of the responses fell at the extremes of the scale under Not at All or Daily usage by teachers and students.

For teachers, the technology tools that had a response of 50% or more of Not at All were as follows: Cell Phone (58%), Average Hardware (58.8%), and Average Web-Based Communication (66.2%). Daily usage of technology tools responses were Computers (84.1%). For students, the technology tools that had a response of 50% or more of Not at All were as follows: Cell Phone (79.8%), Average Hardware (65.5%),

Average Web-Based Communication (76.4%), and Average Software (62.9%).

Table 9

Usage of Technology Tools by Teachers and Students for Instructional Purposes

	Teachers				Students			
	Not at All	Monthly	Weekly	Daily	Not at All	Monthly	Weekly	Daily
Computer	1.1%	5.7%	9.1%	84.1%	6.0%	18.5%	47.0%	28.6%
Cell Phone	58.0%	8.0%	6.3%	27.8%	79.8%	6.0%	0.0%	14.3%
Hardware (Avg.)	58.8%	16.2%	7.7%	17.3%	65.5%	12.4%	9.1%	13.0%
Web-Based Communication (Avg.)	66.2%	14.4%	6.4%	13.1%	76.4%	12.8%	5.8%	5.0%
Software (Avg.)	46.2%	24.9%	14.8%	14.1%	62.9%	23.8%	8.9%	4.4%

During focus groups, teachers commented that they used Activeboards, basic videos and Internet websites. It was also revealed that over 10,000 video clips had been downloaded in the district during the first four months of the school year. The video clips are downloaded through United Streaming which allowed educators to download video clips, virtual labs, interactive audio files, lesson plans, and other curriculum-enhancing materials for teachers (Anonymous, personal communication, November, 16, 2010).

Survey Question 42 (Table 10) asked the participants how well informed they felt about different types of educational technology. A 4-choice Likert response scale of Not Well Informed, Somewhat Informed, Fairly Well Informed, and Very Well Informed was

used to record responses. Overall, teachers felt very well informed about each type of educational technology.

Table 10

Perception for Different Types of Educational Technology

	N =	Not Well Informed	Somewhat Informed	Fairly Well Informed	Very Well Informed	Mean
Instructional Software	162	4%	17%	23%	56%	3.3
Instructional Television	161	7%	27%	29%	37%	2.96
Internet	162	1%	4%	20%	75%	3.7
E-mail	159	1%	3%	21%	75%	3.7
Interactive Whiteboard / Promethean Board	163	12%	13%	29%	46%	3.09
Scanner	162	14%	15%	26%	45%	3.02
Digital Camera	161	9%	15%	29%	47%	3.13
Presentation Systems	162	10%	11%	29%	50%	3.19

Survey Question 43 (Table 11) asked the teachers to rate themselves concerning the use of technology for instruction. A rating-type question with three choices of Beginner, Intermediate, or Advanced was used to record responses. The majority of teachers chose Intermediate (68%). This rating was echoed during focus groups. Teachers also said that they felt proficient in the things that they had access to daily but that they often encountered technology that they did not feel comfortable with in their teaching (Anonymous, personal communication, November, 16, 2010).

Table 11

Level of Expertise in Using Technology for Instruction

	Teacher Responses	
Beginner	15	9.04%
Intermediate	113	68.07%
Advanced	38	22.89%

Research Question 2

What is the impact of 21st Century Technology Tools on the context for learning? Survey Questions 10-15, 31, 35-37, 51-52, and focus group responses were used to ascertain the impact of 21st Century Tools on the context for learning. Survey question 10 (Table 12) asked the survey respondent to indicate what studies were included when students worked towards mastery of core subjects. The responses were recorded via a rating-type question. Administrators and teachers (121) believed that when students work towards mastery of core subject, their study included a significant amount of 21st Century Content taught in a 21st Century Context.

Table 12

Studies Included When Students Work Toward Mastery of Core Subjects

	Admin	Teachers
a. Only the core subjects	6 50.0%	38 20.54%
b. A significant amount of 21st Century content taught in a 21st Century context	5 41.67%	116 62.70%
c. All instruction includes 21st Century content taught in a 21st Century Context	1 8.33%	31 16.76%
Total	12	185
Mean Responses	1.58	1.96

Survey Question 11 (Table 13) asked the survey respondent what instruction

looked like in their schools. The responses were recorded via a rating-type question. The majority of administrators and teachers (113) responded that instruction included a significant amount of contemporary content in a contemporary context.

Table 13

Instruction in the Schools Within the District of Study

	Admin	Teachers
a. Instruction includes some contemporary content in a contemporary context.	5 41.67%	63 34.05%
b. Instruction includes a significant amount of contemporary content in a contemporary context.	6 50.0%	107 57.84%
c. Instruction always includes contemporary content in a contemporary context.	1 8.33%	15 8.11%
Total	12	185
Mean Responses	1.67	1.74

Survey Question 12 (Table 14) asked the survey respondent to indicate what 21st Century Content was included in their schools. The responses were recorded via a rating-type question. Administrators and teachers (122) gave an average response that the content in their school included many relevant examples, settings and some original content, such as global awareness and civic and business literacy.

Table 14

21st Century Content in Schools Within the District of Study

	Admin	Teachers
a. Some relevant examples and settings but no original content.	2 16.67%	41 22.16%
b. Many relevant examples, settings and some original content, such as global awareness, civic and business literacy.	10 83.33%	112 60.54%
c. A significant amount of relevant examples, applications, settings and original content, and where applicable, 21st Century Content that is relevant to the economic needs of your school.	0 0%	32 17.30%
Total	12	185
Mean Responses	1.83	1.95

Survey Question 13 (Table 15) asked the survey respondent to indicate how learning skills were incorporated into educational objectives and instruction. The responses were recorded via a rating-type question. The majority of administrators and teachers (128) gave a response that learning skills were often included in educational objectives primarily through curriculum and teaching strategies, and they were often integrated into content.

Table 15

Incorporation of Learning Skills Into Educational Objectives and Instruction

	Admin	Teachers
a. Learning skills are occasionally included in educational objectives primarily through curriculum and teaching strategies, and they are occasionally integrated into content.	2 16.67%	26 13.98%
b. Learning skills are often included in educational objectives primarily through curriculum and teaching strategies, and they are often integrated into content.	8 66.67%	120 64.52%
c. All educational objectives and teaching strategies emphasize the integration of learning skills and 21st Century Tools, and these are used to enable students to effectively build content knowledge.	2 16.67%	40 21.51%
Total	12	186
Mean Responses	2	2.08

Survey Question 14 (Table 16) asked the survey respondent to indicate how learning tools (such as computers, PDAs, etc.) were used in their schools. The responses were recorded via a rating-type question. Administrators and teachers agreed (115) that 100% of students had access to traditional tools, 50% or more of students had access to 21st Century Tools, and 50% or more of teachers used 21st Century Tools. Focus group responses were that computers were not easily accessible (4 teachers), or they had access due to proximity or a special circumstance (2 teachers) (Anonymous, personal communication, November 16, 2010).

Table 16

Use of Learning Tools in the Schools Within the District of Study

	Admin	Teachers
a. 100% of students have access to traditional tools and 10% or more of teachers use 21st Century Tools.	3 25.0%	25 13.66%
b. 100% of students have access to traditional tools, 50% or more of students have access to 21st Century Tools and 50% or more of teachers use 21st Century Tools.	9 75.0%	106 57.92%
c. 100% of students have access to traditional tools, 100% of students have access to 21st Century Tools and 100% of teachers use 21st Century Tools.	0 0%	52 28.42%
Total	12	184
Mean Responses	1.75	2.15

Survey Question 15 (Table 17) asked the survey respondent to indicate how assessment was used in their schools. The responses were recorded via a rating-type question. The majority of administrators and teachers (121) agreed that some assessments reflected the integration of learning skills, assessment was more frequent, and there was increased technology use in the assessment process.

Table 17

Use of Assessment in Schools Within the District of Study

	Admin	Teachers
a. Assessments focus on mastery of core subject content and are mostly pencil and paper based.	3 25.0%	38 20.77%
b. Some assessments reflect the integration of learning skills, assessment is more frequent and there is increased technology use in the assessment process.	8 66.67%	113 61.75%
c. All assessment is learner-centered, formative, content specific, ongoing and rooted in teaching strategies and most assessments use technology.	1 8.33%	32 17.49%
Total	12	183
Mean Responses	1.83	1.97

Survey Question 31 (Table 18) asked the survey respondent to indicate how their district or schools worked with business leaders. The responses were recorded via a rating-type question. The majority of administrators, business owners, and teachers (118) believed that K-12 and private sector partners occasionally work together to address student preparation for the workforce, and businesses support education and encouraged programs that promoted 21st Century Skills.

Table 18

School or District Degree of Work With Business Leaders

	Admin	Business	Teachers
a. K-12 and private sector partners rarely work together to address student preparation for the workforce but some businesses support education and encourage programs that implement technology.	3 25.0%	3 8.75%	44 25.73%
b. K-12 and private sector partners occasionally work together to address student preparation for the workforce and businesses support education and begin to encourage programs that promote 21st Century Skills.	6 50.0%	12 75.0%	100 58.48%
c. K-12 and private sector partners regularly work together to ensure student preparation for the workplace and the mastery of 21st Century Skills, and businesses regularly support educational programs that promote 21st Century Skills.	3 25.0%	1 6.25%	27 15.79%
Total	12	16	183
Mean Responses	2	1.88	1.9

Survey Question 35 and 36 (Table 19) asked the participants to specify how often they used technology for varying types of activities. A 7-choice Likert response scale, (Not at All, Less than Once a Month, Once a Month, Several Times a Month, Once a Week, Several Times a Week, and Daily) was used to record responses. The responses

were grouped into categories to narrow the data. Monthly consisted of Less than Once a Month, Once a Month, and Several Times a Month. Once a Week and Several Times a Week were grouped into the category designated as Weekly. The complete graphs can be viewed in Appendices M and N. The majority of the responses fell under Not at All or Monthly. The one exception was that teachers used technology on a daily basis to Locate Internet/Web Resources (30.3%).

Table 19

Usage of Technology for Instructional Purposes for Different Activity Types

	Teachers				Students			
	Not at All	Monthly	Weekly	Daily	Not at All	Monthly	Weekly	Daily
Data Collection	34	52	38	42	62	46	29	27
	20.48%	31.33%	22.89%	25.30%	37.80%	28.05%	17.68%	16.46%
Solving Real-World Problems	23	52	46	44	53	47	33	32
	13.94%	31.52%	27.88%	26.67%	32.12%	28.48%	20.00%	19.39%
Analyzing and/or Visualizing Data	27	49	44	45	55	52	29	27
	16.36%	29.70%	26.67%	27.27%	33.74%	31.90%	17.79%	16.56%
Graphical Presentation of Materials	25	56	50	34	62	62	27	12
	15.15%	33.94%	30.30%	20.61%	38.04%	38.04%	16.56%	7.36%
Webpage Design	107	45	7	5	127	26	6	3
	65.24%	27.44%	4.27%	3.05%	78.40%	16.05%	3.70%	1.85%
Conducting Research	31	54	51	26	56	65	33	10
	19.14%	33.33%	31.48%	16.05%	34.15%	39.63%	20.12%	6.10%
Taking Students on Virtual Field Trips/Virtual Tours	71	71	18	0	92	53	15	1
	44.38%	44.38%	11.25%	0.00%	57.14%	32.92%	9.32%	0.62%
Collaboration	72	60	19	10	100	45	9	3
	44.72%	37.27%	11.80%	6.21%	63.69%	28.66%	5.73%	1.91%
Communication	90	46	17	9	112	31	11	6
	55.56%	28.40%	10.49%	5.56%	70.00%	19.38%	6.88%	3.75%
Basic Skill Development/ Assessment	50	49	42	23	59	45	44	15
	30.49%	29.88%	25.61%	14.02%	36.20%	27.61%	26.99%	9.20%
Locating Internet/Web Resources	24	42	49	50	45	55	38	23
	14.55%	25.45%	29.70%	30.30%	27.95%	34.16%	23.60%	14.29%

Survey Question 37 asked the participants to describe a technology-related assignment that they frequently asked their students to complete. An open-ended question was used. The two themes that were mentioned most often within respondent answers were the use of technology to conduct research (15 teachers) the use of technology for basic skill development or assessment (15 teachers), and the use of technology for the graphical presentation of materials (14 teachers).

Survey Question 51 (Table 20) asked the participants to what degree the integration of technology in their teaching had positively impacted student learning. A rating-type question with the four choices of Extensively, Somewhat, Very Little, or None at All was used to record responses. The results were as follows: one (1%) teacher chose None At All, 5 (3%) chose Very Little, 80 (49%) chose Somewhat, and 76 (47%) chose Extensively. During focus groups, teachers agreed that technology impacted student learning (4 teachers) but voiced a concern about access (5 teachers). One teacher explained that "I have one student who…they live in a hotel. I think it is important to make labs more available because,…. if you look at how many students have free or reduced lunch…… When you have a project, they can't get it done because they ride the bus and can't get to a computer" (Anonymous, personal communication, November 16, 2010).

Table 20

Degree that Integration of Technology Has Positively Impacted Student Learning

	Teacher Responses
None at all	1 1.32%
Very little	5 3.09%
Somewhat	80 49.38%
Extensively	76 46.91%

Survey Question 52 asked the participants to provide examples of how they integrated technology into their teaching to positively impact student learning. An open-ended question was used. The top examples listed were Promethean/Interactive Whiteboard, the Internet, educational software, research, PowerPoint, LCD projectors, and calculators. One teacher said the following of the impact of technology:

> A student in class this year hated to write. He complained and always found other things to do during writing workshop. I allowed him to practice on the Promethean board. He loved working on the board! Once he realized he could write, he has been hard to stop. (Anonymous, personal communication, June 25, 2010)

Focus groups brought out further praise of technology. A teacher said, "I can't imagine not having computers in my classroom. It helps you address all types of learners" (Anonymous, personal communication, November 16, 2010).

Research Question 3

Has training for Technology Skills been implemented as planned? Survey Questions 17, 32, 42-48, and focus group responses were used to determine if the training

for technology skills had been implemented as planned. The district technology goals were as follows:

1. The goal for the Learners and Their Environment section of the District Technology Plan (Appendix J) was that the district would "use research-proven strategies to provide home, school, and community environments conducive to our students achieving technological literacy by the end of the eighth grade and to raise the overall level of academic achievement in South Carolina" (pg. 10);
2. The goal for the Professional Capacity section of the Technology Plan was that the district would "provide curriculum development and professional development to increase the competency of all South Carolina educators so that research-proven strategies and the effective integration of instructional technology systems could be used to increase student achievement" (pg. 19);
3. The goal for the Instructional Capacity section of the Technology Plan was that the district would "use current and emerging technology to create learner-centered instructional environments that enhance academic achievement" (pg. 31);
4. The goal for the Community Connections section of the Technology Plan was that the district would "increase student achievement through the use of technology, including assistive technology, by maximizing community involvement and community partnerships" (pg. 39); 5. The goal for the Support Capacity section of the Technology Plan was that the district would "expand and support technology resources to assist educators and learners in meeting the state academic standards. The goal also included seeking out other funding sources. (pg. 46)

Survey Question 17 (Table 21) asked the survey respondent to indicate the role of professional development in their school. The responses were recorded via a rating-type question. Ninety-eight (49.7%) of all administrators and teachers agreed that professional development often integrated the application of learning skills into teaching strategies and occasionally integrated the application of contemporary context and content into teaching strategies.

Table 21

Role of Professional Development in Schools Within the District of Study

	Admin	Teachers
a. Professional development primarily supports content knowledge, administrative processes and professional development occasionally integrates learning skills into teaching strategies.	5 41.67%	42 22.70%
b. Professional development often integrates the application of learning skills into teaching strategies and occasionally integrates the application of contemporary context and content into teaching strategies.	6 50.0%	92 49.73%
c. Professional development supports the application of 21st Century Skills in teaching and learning strategies and classroom management practices, and all teachers use professional development to reinforce their content competency and integrate 21st Century Skills.	1 8.33%	51 27.57%
Total	12	185
Mean Responses	1.67	2.05

Survey Question 32 (Table 22 and Appendix O) asked the participants how well informed they felt about different types of educational technology. A 3-choice Likert response scale of No Impact, Moderate Impact, and High Impact was used to record responses. The responses were recorded in the table with the amounts that were indicated for the students use of the coordinating type of educational technology. Computers (72.20%) were chosen to have a high impact on student achievement, and 75.6% of

teachers allowed students to use computers on a daily or weekly basis for instructional purposes.

Survey Question 34 asked the participants to specify how often 21st Century Technology Tools were integrated for instructional purposes. A 7-choice Likert response scale, Not at All, Less than Once a Month, Once a Month, Several Times a Month, Once a Week, Several Times a Week, and Daily was used to record responses. The responses were grouped into categories to narrow the data. Monthly consisted of responses of Less than Once a Month, Once a Month, and Several Times a Month. Once a week and several times a week responses were grouped into the category designated as Weekly. The complete graph can be viewed in Appendix L. The majority of the responses fell at the extremes of the scale under Not at All or Daily. The technology tools that had a response of 50% or more of Not at All were as follows: Cell Phone (79.8%), Average Hardware (65.5%), Average Web-Based Communication (76.4%), and Average Software (62.9%).

Table 22

Student Use of Technology vs. Perceived Impact on Student Achievement

	Students Use				Perceived Impact on Student Achievement		
	Not at All	Monthly	Weekly	Daily	No Impact	Moderate Impact	High Impact
Computer	6.0%	18.5%	47.0%	28.6%	0.6%	27.3%	72.2%
Cell Phone	79.8%	6.0%	0.0%	14.3%	54.9%	26.3%	18.9%
Hardware (Average)	65.5%	12.4%	9.1%	13.0%	35.0%	31.4%	33.6%
Web-Based Communication (Average)	76.4%	12.8%	5.8%	5.0%	46.4%	31.0%	22.7%
Software (Average)	62.9%	23.8%	8.9%	4.4%	28.9%	39.3%	31.8%

Survey Question 42 (Table 23) asked the participants how well informed they felt about different types of educational technology. A 4-choice Likert response scale of Not Well Informed, Somewhat Informed, Fairly Well Informed, and Very Well Informed was used to record responses. Overall, teachers felt very well informed about each type of educational technology.

Table 23

Perception for Different Types of Educational Technology

	N =	Not Well Informed	Somewhat Informed	Fairly Well Informed	Very Well Informed	Mean
Instructional Software	162	4%	17%	23%	56%	3.3
Instructional Television	161	7%	27%	29%	37%	2.96
Internet	162	1%	4%	20%	75%	3.7
E-mail	159	1%	3%	21%	75%	3.7
Interactive Whiteboard / Promethean Board	163	12%	13%	29%	46%	3.09
Scanner	162	14%	15%	26%	45%	3.02
Digital Camera	161	9%	15%	29%	47%	3.13
Presentation Systems	162	10%	11%	29%	50%	3.19

Survey Question 43 (Table 24) asked the participants to rate themselves concerning the use of technology for instruction. A rating-type question with three choices of Beginner, Intermediate, or Advanced was used to record responses. The majority of teachers chose Intermediate (68%).

Table 24

Self Rating for the Use of Technology for Instruction

	Teacher Responses	
Beginner	15	9%
Intermediate	113	68%
Advanced	38	23%

Survey Question 44 (Table 25) asked the participants to rate the effectiveness of different training formats they had experienced during the last three years to familiarize themselves with computer technology. A 4-choice Likert response scale of Very Effective, Effective, Ineffective, and Never Used was used to record responses. Based on the highest recorded percentage for each type, the teachers chose "Effective" for the following: in-service (full day), in-service (half day), after school workshop, conference workshop (hands-on), instruction manual, on-line resources (web site), university credit course, talk with other teachers, and self-study (hands-on). The teachers stated that Saturday workshop, conference session (no hands-on), and university non-credit course were never used.

Table 25

Effectiveness of Computer Technology Training Formats During the Previous Three Years

	N =	Very effective	Effective	Ineffective	Never Used	Mean
In-service (full day)	156	21%	47%	17%	15%	2.25
In-service (half day)	158	18%	63%	12%	7%	2.08
After school workshop	159	18%	43%	22%	17%	2.38
Saturday workshop	147	3%	9%	10%	78%	3.63
Conference session (no hands-on)	149	4%	21%	32%	43%	3.14
Conference workshop (hands-on)	154	25%	38%	6%	31%	2.44
Instruction manual	152	12%	50%	22%	16%	2.42
On-line resources (web site)	155	19%	62%	9%	10%	2.09
University non-credit course	148	14%	34%	13%	39%	2.76
University credit course	154	22%	47%	8%	23%	2.32
Talk with other teachers	159	38%	53%	6%	3%	1.74
Self-study (hands-on)	156	38%	49%	7%	6%	1.8

Survey Question 45 (Table 26) asked the participants to rate the effectiveness of the different instructional methods or characteristics that they had experienced while attending a technology-oriented training within the last three years. A 4-choice Likert response scale of Very Effective, Effective, Ineffective, Never Experienced was used to record responses. Overall, teachers felt that all forms were effective.

Table 26

Effectiveness of Instructional Methods or Characteristics for Technology-Oriented Training

	N =	Very Effective	Effective	Ineffective	Never Experienced	Mean
Lecture	160	4%	45%	46%	5%	2.51
Hands-on skill attainment	160	46%	46%	3%	5%	1.68
Lecture/Hands-on combination	160	41%	49%	4%	6%	1.74
Teleconference/ Videoconference	154	6%	33%	17%	44%	2.99
Computer-based tutorial	159	15%	58%	13%	14%	2.25
Group Investigation	158	14%	51%	11%	24%	2.45
Individualized learning	158	28%	54%	9%	9%	1.99
Team learning (with at least one partner)	158	23%	56%	6%	15%	2.14
Video-taped lesson	157	3%	38%	21%	38%	2.94
Web-based tutorial (Internet)	156	15%	49%	19%	17%	2.38

Survey Question 46 (Table 27) asked the participants to indicate their preferences for each instructional method or characteristic when attending future technology-oriented training. A 4-choice Likert response scale from Least Preferred to Most Preferred was used to record responses. The most preferred instructional method or characteristics were hands-on skill attainment (59%) and lecture/hands-on combination (45%). The least preferred were lecture (53%) and video-taped lessons (38%). Focus group responses yielded hands-on and small group as preferences for future technology-oriented trainings within the district (Anonymous, personal communication, November 16, 2010).

Table 27

Preferences for Attending Future Technology-Oriented Training

	N =	Least Preferred			Most Preferred	Mean
Lecture	158	53%	30%	15%	2%	1.66
Hands-on skill attainment	158	5%	10%	26%	59%	3.39
Lecture/Hands-on combination	157	4%	10%	41%	45%	3.25
Teleconference/Videoconference	157	34%	41%	21%	4%	1.96
Computer-based tutorial	157	10%	40%	35%	15%	2.55
Group Investigation	157	18%	27%	38%	17%	2.54
Individualized learning	155	9%	30%	36%	25%	2.78
Team learning (with at least one partner)	158	8%	21%	45%	26%	2.89
Video-taped lesson	157	38%	37%	19%	6%	1.94
Web-based tutorial (Internet)	157	15%	41%	28%	16%	2.45

Survey Question 47 (Table 28) asked the participants to indicate which formats they preferred to attend for future training experiences. A 4-choice Likert response scale from Most Preferred to Least Preferred was used to record responses. Saturday workshop (78%) and conference session without hands-on (62%) were among the most strongly least preferred. The most preferred was university credit course (36%). The other choices fell in the middle on the most preferred side.

Table 28

Format Preferences for Future Training Experiences

	N =	Most Preferred			Least Preferred	Mean
In-service (full day)	156	24%	24%	24%	28%	2.56
In-service (half day)	156	29%	48%	15%	8%	2.01
After school workshop	156	10%	27%	22%	41%	2.95
Saturday workshop	156	11%	6%	5%	78%	3.49
Conference session (no hands-on)	153	10%	12%	16%	62%	3.3
Conference workshop (hands-on)	155	35%	41%	14%	10%	1.99
Instruction manual	153	12%	28%	33%	27%	2.74
On-line resources (web site)	155	19%	39%	26%	16%	2.37
University non-credit course	153	12%	28%	23%	37%	2.84
University credit course	154	36%	32%	19%	13%	2.07
Talk with other teachers	154	31%	44%	20%	5%	1.99
Self-study (hands-on)	155	30%	40%	24%	6%	2.07

Table 29 was a combination of Questions 48, 49, and 50. All were a 4-choice Likert response scale (from Least Preferred = 1 to Most Preferred = 4) was used to record responses. Survey Question 48 asked the participants to indicate their preference for a method/characteristic for future experiences. The majority of responses were over 2.3 with the highest being 3.03 for having other teachers as the method of training. Survey Question 49 asked the participants to indicate their preference for a method/characteristic for future experiences. All of the responses ranged from a mean of 1.67 to 3.29. Survey question 50 asked the participants to indicate their preference for a method/characteristic for future experiences. The least preferred training times were during the summer break (58%), during a scheduled in-service day at the end of the school year (35%), in the morning–before the regular school day begins (81%), after a regular school day (55%),

half-day on Saturday morning (83%), and full-day on Saturday (88%). The most preferred training times were during a scheduled in-service day at the start of the school year (44%) and during a scheduled in-service day during the school year (47%).

Table 29

Future Training Methods, Locations, and Times

Future Training Methods	N =	Least Preferred			Most Preferred	Mean
District Technology Staff	154	10%	16%	45%	29%	2.94
School District Staff	153	10%	21%	48%	21%	2.8
Building-level Administrators	153	14%	32%	43%	11%	2.5
Other Teachers	152	7%	14%	49%	30%	3.03
University/College Faculty	151	11%	23%	44%	22%	2.76
Software/Hardware Vendors (Sellers or Retailers)	151	26%	28%	30%	16%	2.35
Future Training Locations						
In your classroom	152	3%	12%	38%	47%	3.28
In another classroom within your school	153	5%	12%	65%	18%	2.98
In your school's computer lab	154	4%	5%	49%	42%	3.29
In your school's teacher center	146	26%	18%	41%	15%	2.45
Another school within the district	154	40%	30%	23%	7%	1.97
On a nearby College/University campus	154	38%	24%	29%	9%	2.08
At a State Department of Education Site	153	61%	19%	13%	7%	1.67
Future Training Times						
During the summer break	156	58%	18%	17%	7%	1.74
During a scheduled in-service day at the start of the school year	156	11%	10%	35%	44%	3.12
During a scheduled in-service day during the school year	157	3%	5%	45%	47%	3.36
During a scheduled in-service day at the end of the school year	158	35%	26%	21%	18%	2.23
In the morning-before the regular school day begins	155	81%	9%	8%	2%	1.3
After a regular school day	156	55%	24%	17%	4%	1.69
Half-day (3 hours) on Saturday morning	157	83%	9%	4%	4%	1.29
Full-day (6 hours) on Saturday	156	88%	6%	4%	2%	1.2

The specific Technology Dimensions were addressed during open response as well as focus groups. Technology Dimension I goal was that the school district will use research-proven strategies to provide home, school, and community environments conducive to our students achieving technological literacy by the end of the eighth grade and to raise the overall level of academic achievement in South Carolina (Appendix J). The district developed and maintained a networked environment to provide teachers and students with opportunities to share resources and collaborate. Four technology coaches were assigned to different schools. Curriculum guides were updated and issued to teachers. Keyboarding instruction during elementary years and keyboarding courses are offered during the middle school grades. The results can be seen in Table 30.

Table 30

Technology Dimension I

Objectives and Strategies	Proof
1.1 Students will use technology to acquire and demonstrate communication, collaboration and engagement skills that are aligned with state standards across the curriculum and will thereby increase their level of academic achievement.	Developed and maintained a networked environment to provide teachers and students with opportunities to share resources and collaborate.
1.2 Students will engage in authentic learning activities that are aligned with the state standards and that integrate technology, including assistive technology, into the core content.	Four technology coaches assigned to different schools. Curriculum guides were updated and issued to teachers.
1.3 Students will select the appropriate tools to complete authentic, real- life multidisciplinary tasks.	Exhibited in all special education classrooms and in multiple regular education rooms
1.4 Students will demonstrate technology proficiency by the end of the eighth grade.	Keyboarding instruction during elementary years and keyboarding course offered during the middle school grades
1.5 XXXXXXXX School District will provide students with an enhanced learning environment through technological tools, including assistive technology, that are designed to promote high academic achievement.	Developed and maintained a networked environment to provide teachers and students with opportunities to share resources and collaborate.

Technology Dimension II goal was that the school district and its' schools will provide curriculum development and professional development to increase the competency of all South Carolina educators so that research-proven strategies and the effective integration of instructional technology systems can be used to increase student achievement (Appendix J). The district required Technology Proficiency Certification of all teachers. Needs assessment surveys were administered to teachers and administrators. Evaluations were administered at the end of each professional development course. Four technology coaches were made available to schools as well as multiple technology

classes, a list of professional development opportunities on the SCTLC (South Carolina: Teaching, Learning, Connecting) the Web portal, and KnowldegeNet with topics by subject, grade, etc. The results can be seen in Table 31 below.

Table 31

Technology Dimension II

Objectives and Strategies	Proof
2.1 XXXXXXXX School District will enable educators to achieve and demonstrate proficiency in integrating state-recommended instructional technology standards (ISTE NETS-A, ISTE NETS-S, and ISTE NETS-T) into their specific area of professional practice to increase student achievement.	Technology proficiency certification
2.2 XXXXXXXX School District will provide the schools with multidimensional technology leadership whose focus is to ensure that technology is making a significant instructional and administrative impact for students, teachers, and administrators.	Four technology coaches available to schools
2.3 XXXXXXXX School District will provide schools with information and training in technology integration so that teachers can use research-based best-practice instructional methods throughout the curriculum.	Multiple classes offered, list of professional development opportunities on the SC: Teaching, Learning, Connecting Web portal, KnowldegeNet has topics by subject, grade, etc.
2.4 XXXXXXXX School District will assess the overall effectiveness of professional development in the area of instructional technology standards and the impact of technology on student achievement.	Technology proficiency certification, needs assessment survey administered to teachers and administrators, evaluations given at the end of each professional development course

Technology Dimension III goal was that the school district will use current and emerging technology to create learner-centered instructional environments that enhance academic achievement (Appendix J). The district made Internet access available for

school websites from home, for example, Odysseyware, curriculum notebooks, KnowledgeNet and developed and maintained a networked environment to provide teachers and students with opportunities to share resources and collaborate. Interactive technology (Promethean Boards and CPS systems) with the content based on our curriculum guides have been developed and provided to the teachers. The results can be seen in Table 32 below.

Table 32

Technology Dimension III

Objectives and Strategies	Proof
3.1 The XXXXXXXX School District will develop a technology framework that addresses the steps necessary to create a technology-rich environment that will foster increased achievement by all students, including those with special needs.	Developed and maintained a networked environment to provide teachers and students with opportunities to share resources and collaborate.
3.2 The XXXXXXXX School District and the schools will provide teachers with the technology resources, including assistive technology, necessary to increase academic achievement.	Examples would be interactive technology (Promethean Boards and CPS systems) with the content based on the curriculum guides developed and provided to the teachers.
3.3 The XXXXXXXX School District and the schools will provide students with access to current and emerging technology resources that will extend their learning beyond the traditional classroom setting and schedule.	Internet access to school websites from home, Odysseyware, curriculum notebooks, KnowledgeNet
3.4 The XXXXXXXX School District will provide and support a variety of multimedia equipment and software for teaching and learning.	# of classroom LCD projectors constantly being increased, Odysseyware, Inventory Database system, DELC coordinator

Technology Dimension IV goal was that the school district will increase student achievement through the use of technology, including assistive technology, by maximizing community involvement and community partnerships (Appendix J). The

district established after school hours at school media centers. The Parents of Preschoolers program and Adult Ed began providing training to the community. School websites are linked to teacher webpages as well as KnowledgeNet pages. The results can be seen in Table 33 below.

Table 33

Technology Dimension IV

Objectives and Strategies	Proof
4.1 XXXXXXXX School District will establish community technology partnerships and collaborations by providing tools, resources, and training that support student learning.	Employability diploma, Intouch, Renaissance
4.2 XXXXXXXX School District will provide after-hours training and community access to labs, media centers, and classrooms.	Parents of preschoolers and Adult ed
4.3 XXXXXXXX School District will expand efforts to connect schools and teachers with parents and students, promote meaningful parental involvement, and foster increased communication so that parents are able to reinforce the instruction their child receives at school.	Intouch, Powerschool, Old English Consortium, KnowledgeNet

Technology Dimension V goal was that the school district will expand and support technology resources to assist educators and learners in meeting the state academic standards and to seek out other funding sources (Appendix J). The district established a Technology Inventory Database. Multiple random surveys were given to teachers and administrators about standards. An upgraded plan was implemented until budget cuts. The Information Management Services department is training constantly on the maintenance of the firewall. Decentralized backups on-site, at the district office, and Cloud Based Services were established. The technology staff is constantly working with

special services to increase web-based instruction and accessibility. The results can be seen in Table 34 below.

Table 34

Technology Dimension V

Objectives and Strategies	Proof
5.1 XXXXXXXX School District will ensure that all teachers and students have the required instructional technology resources and those resources are easily accessible and fully operational.	Technology Inventory Database, multiple random surveys given, upgrade plan in place until budget cuts
5.2 XXXXXXXX School District will ensure that their schools have an integrated, secure network infrastructure with bandwidth capacity to support fully converged networks that allow for communication, data collection and distribution, and distance learning.	Training constantly on maintenance of firewall, technology inventory database, Moodle and PODDS, have Cloud Based Services
5.3 XXXXXXXX School District will provide qualified technical staff, including one networking engineer per WAN or per ten LANs, one networking technician per 5 LANS, one district web editor, one instructional database operator, additional SASI support, and one end- user support per five to eight hundred users.	Happened and went away
5.4 XXXXXXXX School District will implement a disaster recovery plan for all points of failure in LANs and WANs, including redundant data storage, robust automated backup, and immediate hardware recovery.	Decentralized backups on-site, at DO, and off-site
5.5 XXXXXXXX School District will increase its ability to design web pages and web-based instruction that are accessible to students and staff with special needs in accordance with Section 508 of the Rehabilitation Act of 1973 as amended by the Workforce Improvement Act of 1998.	Work closely with special services

Research Question 4

What are the barriers and supports to implementation of 21st Century Skills? Survey Questions 19-22, 24, 27, 38-41, and focus group responses were used to indicate the barriers and supports to the implementation of 21st Century Skills. Survey Question 19 (Table 35) asked the survey respondent to indicate the role of administrators in setting the vision for the school. The responses were recorded via a rating-type question. The majority of administrators and teachers (106) believed some administrators include the integration of 21st Century Skills as part of their overall vision for student achievement, and some believed that administrators facilitated and directed a professional vision that encouraged the integration of 21st Century Tools and Skills into the curriculum.

Table 35

Role of Administrators in Setting the Vision for the School

	Admin	Teachers
a. Administrators create visions for student achievement that focus on the mastery of content but few administrators promote a vision that incorporates the integration of 21st Century Skills and Tools into the curriculum.	2 16.67%	38 20.77%
b. Some administrators include the integration of 21st Century Skills as part of their overall vision for student achievement and some administrators facilitate and direct a professional vision that encourages the integration of 21st Century Tools and Skills into the curriculum.	8 66.67%	97 53.01%
c. All administrators include the integration of 21st Century Skills as part of their overall vision for student achievement and act as role models for such integration, as well as create broad and inclusive plans that integrate 21st Century Skills into every aspect of learning, teaching and administrating.	2 16.67%	48 26.23%
Total	12	183
Mean Responses	2	2.05

Survey Question 20 (Table 36) asked the survey respondent to indicate how their school met the access needs of all students. The responses were recorded via a rating-type question. The majority of administrators and teachers (92) agreed that all schools have implemented 21st Century Tools and have started to integrate 21st Century Skills, and 50% or more of students have access to environments that advanced 21st Century Skills.

Table 36

Meeting the Access Needs of All Students

	Admin	Teachers
a. Most schools have technology plans that provide access to 21st Century Tools.	5 41.67%	62 33.70%
b. All schools have implemented 21st Century Tools and have started to integrate 21st Century Skills and 50% or more of students have access to environments that advance 21st Century Skills.	6 50.0%	86 46.74%
c. 21st Century Tools are equitably distributed and there is access through homes, community centers, libraries and after-school programs, and 100% of students have access to environments that advance 21st Century Skills.	1 8.33%	36 19.57%
Total	12	184
Mean Responses	1.67	1.86

Survey Question 21 (Table 37) asked the survey respondent to indicate how resources were allocated. The responses were recorded via a rating-type question. The majority of administrators (5) believed that district resource allocation plans were structured to provide students, parents, teachers, and administrators with seamless access to 21st Century Tools and Technology in school, at home, and any other place where learning activities were envisioned. The majority of teachers (97) believed educational planning and overall enterprise planning were occasionally aligned with technology

planning, and resource planning adequately and substantively addressed and funded educational objectives.

Table 37

Allocation of Resources

	Admin	Teachers
a. Technology planning primarily addresses infrastructure and equipment requirements but rarely addresses educational objectives. Educational and administrative planning requirements are not aligned with technology planning.	3 25.0%	41 22.53%
b. Educational planning and overall enterprise planning are occasionally aligned with technology planning and resource planning adequately and substantively addresses and funds educational objectives.	4 33.33%	97 53.30%
c. District resource allocation plans are structured to provide students, parents, teachers and administrators with seamless access to 21st Century Tools and technology in school, at home and any other place where learning activities are envisioned.	5 41.67%	44 24.18%
Total	12	182
Mean Responses	2.17	2.02

Survey Question 22 (Table 38) asked the survey respondent to indicate how infrastructure and system support were configured. The responses were recorded via a rating-type question. The administrators and teachers (110) agreed that system planning had some focus on the integration of 21st Century Tools into educational strategies, technology support was available on a regular basis, and technology was refreshed every five to seven years.

Table 38

Configuration of Infrastructure and System Support

	Admin	Teachers
a. System planning is focused on the acquisition of technology and traditional tools, technology support is erratic and technology is rarely updated.	3 25.0%	43 23.76%
b. System planning has some focus on the integration of 21st Century Tools into educational strategies, technology support is available on a regular basis and technology is refreshed every five to seven years.	8 66.67%	102 56.35%
c. Infrastructure plans are structured to provide students, parents, teachers and administrators with seamless access to 21st Century Tools and technology in school, there is a process for handling technology support, and all technology is refreshed every three to four years.	1 8.33%	36 19.89%
Total	12	181
Mean Responses	1.83	1.96

Survey Question 24 (Table 39) asked the survey respondent to indicate how policymaking reflected the importance of integrating 21st Century Skills into all aspects of education. The responses were recorded via a rating-type question. The majority of administrators and teachers (100) believed that much curriculum, educational objectives, and standards were aligned with assessment, included some 21st Century Skills, and focused on the integration of learning skills and 21st Century Tools into content and administrative processes.

Table 39

Using Policy to Integrate 21st Century Skills into All Aspects of Education

	Admin	Teachers
a. Some curriculum, educational objectives and standards are aligned with assessment and focus on learning skills but mostly policymaking tends to focus more on core subject mastery and administrative processes.	4 33.33%	51 27.72%
b. Much curriculum, educational objectives and standards are aligned with assessment and include some 21st Century Skills and focus on the integration of learning skills and 21st Century Tools into content and administrative processes.	6 50%	94 51.09%
c. All curriculum, educational objectives and standards are aligned with assessment and include 21st Century Skills and encourage the integration of 21st Century Skills into both content mastery and administrative processes.	2 16.67%	39 21.20%
Total	12	184
Mean Responses	1.83	1.93

Survey Question 27 (Table 40) asked the survey respondent to indicate how their school or district partnered with the community. The responses were recorded via a rating-type question. Administrators and teachers (82) agreed that formal relationships developed between the school and the community, and community programs incorporated learning skills and 21st Century Tools. But the majority of the business owners believed that schools occasionally worked together with communities, and some students participated in community programs that helped them apply 21st Century Tools to their own learning.

Table 40

Partnering with the Community

	Admin	Business	Teachers
a. Schools occasionally work together with communities and some students participate in community programs that help them apply 21st Century Tools to their own learning.	4 33.33%	8 66.67%	74 40.22%
b. Formal relationships begin to develop between the school and the community and community programs incorporate learning skills and 21st Century Tools.	5 41.67%	4 33.33%	77 41.85%
c. Community programs support learner mastery of 21st Century Skills and coordinate with school programs to promote strategies that reinforce 21st Century Skills.	3 25.0%	0 0%	33 17.93%
Total	12	12	184
Mean Responses	1.92	1.33	1.78

Survey Question 38 (Table 41) asked the participants to describe supports that helped them use technology in their instruction. A checklist that required each survey participant to indicate all that were applicable was used. One hundred-fifty (90%) of the respondents had a computer at home. Only 43% believe that technology is a priority of the school community.

Table 41

Supports that Help With the Use of Technology in Instruction

	N =	%
I have a computer at home	150	90%
I have Internet at home	145	87%
access to Internet in my classroom	145	87%
I am interested in using technology for classroom instruction	138	83%
School policy allows access to e-mail	128	77%
Access to Internet elsewhere in my school (computer lab, library/media center)	116	69%
Adequate number of computers elsewhere in my school (computer lab, library/media center)	114	68%
Technical support available at district/regional/state/level	105	63%
Technical support available at school level	100	60%
Technology in my school is up-to-date	95	57%
Network storage capability exists at school	92	55%
Technology is a priority of school administration	92	55%
Technology is a priority of district administration	91	54%
School policy allows for adequate student/teacher use of technology	82	49%
Technology supports my curriculum and does not create extra work/effort on my part	72	43%
Technology is a priority of school community	71	43%
Adequate technology is available for integration (calculators, scientific probes, handheld computers, etc.)	69	41%
Adequate professional development in technology usage	57	34%
Adequate professional development related to content specific technology integration	48	29%
Adequate follow-up to support technology integration	46	28%
Ample funding is designated for technology related professional development	38	23%
I have enough time to explore new technology tools and applications	37	22%
Ample funding is designated for technology	37	22%
Adequate number of computers in my classroom	30	18%
School policy allows access to communicate via blogs, wikis, and other social networking tools	20	12%
Incentives are provided for participating in technology training	25	15%
Other (describe)	3	2%

Survey Question 39 (Table 42) asked the participants to describe a support that

was most significant in making him/her successful and/or preventing him/her from integrating technology. An open-ended question was used. The most common response concerned access to computers or the Internet which was met with positive and negative responses. The presence of help from the technical support staff was second, with the availability of courses/training being third.

Table 42

Supports for Integrating Technology

	Positive Responses	Neutral Responses	Negative Responses
Access	5	9	14
Courses/Training	16	0	2
Help from Technical Support Staff	18	0	2

Survey Question 40 (Table 43) asked the participants to describe barriers that prevented them from using technology in their instruction. A checklist was used that required participants to check all responses that applied. All choices except one were 50% or below. "An inadequate number of computers in the classroom" was the response chosen by 79% of respondents as a barrier to the use of technology in instruction.

Table 43

Barriers that Prevent the Use of Technology in Instruction

	N =	%
Inadequate number of computers in my classroom	119	79%
I do not have enough time to explore new technology tools and applications	71	47%
Ample funding is not designated for technology	48	32%
Ample funding is not designated for technology related professional development	45	30%
Inadequate professional development in technology usage	40	27%
Inadequate technology is available for integration (calculators, scientific probes, handheld computers, etc.)	40	27%
Inadequate professional development related to content specific technology integration	39	26%
Incentives are not provided for participating in technology training	39	26%
Inadequate number of computers elsewhere in my school (computer lab, library/media center)	37	25%
School policy does not allow access to communicate via blogs, wikis, and other social networking tools	38	25%
Inadequate follow-up to support technology integration	36	24%
Technical support not available at school level	17	11%
Technology in my school is outdated	20	13%
School policy does not allow for adequate student/teacher use of technology	19	13%
Technology is not a priority of district administration	18	12%
Technology is not a priority of school administration	15	10%
Technology is not a priority of school community	14	9%
I do not have Internet at home	11	7%
Technology does not support my curriculum and does not create extra work/effort on my part	10	7%
Network storage capability does not exist at school	7	5%
I do not have a computer at home	6	4%
No access to Internet in my classroom	6	4%
Technical support not available at district/regional/state/level	4	3%
School policy does not allow access to e-mail	3	2%
Other (describe)	3	2%
I am not interested in using technology for classroom instruction	2	1%
No access to Internet elsewhere in my school (computer lab, library/media center)	2	1%

Survey Question 41 asked the participants to describe the barrier that was the most significant in making him/her successful and/or preventing him/her from integrating technology. An open-ended question was used. The greatest barrier was access to computers or the Internet (25 teachers) and funding (24 teachers). Lack of time (19 teachers) and the need for training (12 teachers) were also mentioned as barriers. During focus groups, teachers complained of access problems due to blocked websites as well as broken equipment (3 teachers). All teachers within one focus group agreed that the main barrier to technology is funds (11 teachers) (Anonymous, personal communication, November 16, 2010).

Summary

Research Question 1 was to determine the impact of 21st Century Technology Tools training on the frequency of use in the classroom. Administrators and teachers were asked about the integration of 21st Century Tools as well as how often technology was used for instructional purposes. Teachers were also asked about different types of educational technology. Finally, the teachers were asked to rate themselves concerning the use of technology for instruction.

Research Question 2 addressed the impact of 21st Century Tools on the context for learning. Administrators and teachers were asked about the amount of 21st Century Content taught to students while working toward mastery of core subjects. They were also asked about the content within their schools including the indication of how learning skills were incorporated into educational objectives and instruction. Access to 21st Century Tools, assessment of learning skills, the impact of technology integration, and the types of activities that technology was used for were also addressed. Business

owners, administrators, and teachers were asked about the extent to which schools (or their district) partner with the private sector to address student preparation for the workforce, businesses support of education, and encouraged programs that promoted 21st Century Skills.

Research Question 3 was to determine if the training for technology skills had been implemented as planned. Administrators and teachers were asked about professional development. Teachers were asked about the impact computers had on student achievement. Their level of knowledge about different types of educational technology was assessed as well as the effectiveness of different training formats they had experienced during the last three years to familiarize themselves with computer technology. Teachers were asked to rate the effectiveness of instructional methods or characteristics they had experienced while attending a technology-oriented training within the last three years. Finally, teachers were asked to rate future trainings in terms of their preferences for: instructional method or characteristics, format, method of training, method/characteristic, and training times.

Research Question 4 asked for the barriers and supports to the implementation of 21st Century Skills. Administrators and teachers were asked if their schools' administrators vision included the integration of 21st Century Skills as part of their overall vision for student achievement. They were also asked about the implementation, integration, and access of 21st Century Tools and Skills in schools.

Administrators and teachers answered questions about resource allocation, system planning, and assessment. Business owners, administrators, and teachers were all asked to indicate how their school or district partnered with the community. Teachers were

asked to list supports and barriers to the use of technology for instruction.

In Chapter 5 the study will deal with the findings and conclusions.

Chapter 5: Findings and Conclusions

Introduction

Chapter 5 will explore four aspects of this study. The summary will provide a synopsis of the study. A summary of the findings will be discussed in terms of demographics and each research question as per Chapter 4. Conclusions will be discussed based on the data that was collected. Suggestions based on the conclusions drawn will be included and thoughts for future study will be given.

Summary of the Study

The purpose of this study was to evaluate the technology tools used by students and the quality or types of usage by teachers and students in a rural school district, as defined by the recommendations of the Partnership for 21st Century Skills. Second, the study examined the barriers and supports, as well as training that impacted teacher and student usage within the curriculum.

The following research questions were the focus and the purpose of this study:

1. What is the impact of 21st Century Technology Tools training on the frequency of use in the classroom?
2. What is the impact of 21st Century Technology Tools on the context for learning?
3. Has training for Technology Skills been implemented as planned?
4. What are the barriers and supports to implementation of 21st Century Skills?

The focus for the literature review was the changes in education pertaining to technology, the context for learning in schools based on the use of technology, 21st

Century Skills, and technological training and professional development.

The research questions came from a combination of three previously tested surveys and were compiled by the researcher as the Technology Tools, Use, and Training Survey (Appendix D). The three surveys contained within the instrument were: The West Virginia Teacher' Technology Tools and Use Survey (Clark, 2008), *The Instructional Technology in the Classroom: A Training Needs Assessment* (Smith, 2001), and *The Online Milestones for Improving Learning and Education (MILE) guide Assessment* (Partnership for 21st Century Skills, n.d.c). The *West Virginia Teacher' Technology Tools and Use Survey* was developed by Deborah D. Clark. The survey was comprised of open-ended as well as closed-ended questions. The survey focused on the instructional use of technology tools and the supports or barriers to technology use. The survey instrument was developed and validated by the researcher. The researcher used a panel of experts that were "actively using technology for their teaching assignments" (Clark). The experts were polled and their responses were used to revise the instrument.

The second survey was the *Instructional Technology in the Classroom: A Training Needs Assessment* (Smith, 2001) developed by Sandra J.W. Smith. This survey used closed-ended questions that focused on teacher training experience and teacher training needs. Smith adapted this survey from two previously used surveys. One was from the *Monroe County Community School Corporation Survey* which was used in May 1996, and the other was from the *TEA-AEL Survey of Educational Technology in the Classroom* which was used in 1991. The first was used to develop a training needs assessment. The second survey was used to describe the use of technology in Tennessee County schools. Permission to use and adapt these instruments was granted to the

researcher in advance (Appendix B).

In addition, the *Online Milestones for Improving Learning and Education (MILE) guide Assessment* (Partnership for 21st Century Skills, n.d.c) was added to the survey to assess the current stage of the district in terms of 21st Century Skills. The Partnership for 21st Century Skills (2003) developed the MILE guide through the feedback of researchers, employers, and educators. The creators presented the MILE guide at meetings and conferences, which included a Partnership-organized focus group that consisted of "teachers, students, administrators, state educational technology directors, after-school program directors and others in the education community" (Partnership for 21st Century Skills, 2003). Feedback was requested from educational leaders to validate the instrument.

The participants in this study were the teachers, administrators, district office personnel, selected community members, and business owners in a rural South Carolina school district during the 2009-2010 school year. The participants were sent the survey via an online survey tool. Teachers (654), administrators (28), and local businesses persons (75) were sent the survey electronically. Three hundred twenty-three surveys were returned but only 217 were completed. Only the completed surveys were used (188 or 28.7% from teachers, 12 or 42.9% from administrators and 17 or 22.7% from businesses). This resulted in an overall response rate of 28.6% (29.4% overall from teachers and administrators).

Demographic Findings

Seven hundred and fifty-eight surveys were sent to teachers, administrators, and business people. Two hundred seventeen were returned in completed form and used for

this study. The respondents were of different ages, educational levels, and experiences. All participants worked in the same county as the participating school district. The majority, 65 (30%), were between the ages of 41 and 50.

The majority of administrators, 18 (30.00%) had worked in education for eighteen or more years. The majority of teachers, 162 (24.73%) had been teaching for six to ten years. The educational levels of the participants varied with 8 (67%) being the most administrators having an Education Specialist or masters plus 45 hours. The majority of the members of the business community responded with 11 (65%) having earned a bachelors degree. A masters degree was held by the majority of teachers (98 or 53%).

Research Question 1 Findings and Conclusions

Research Question 1 was to determine the impact of 21st Century Technology Tools training on the frequency of use in the classroom. This was evaluated as high impact if a percentage of 50% or more of teachers and administrators responded in the following manner: 1) 50% to all teachers consistently integrate the use of 21st Century Tools into the classroom, 2) 50% or more of teachers classified their level of expertise in using technology for instruction as Intermediate to Advanced, and 3) 50% of technology tools are used on a weekly to daily basis within the classroom. It was found that 122 (62.89%) administrators and teachers believed that "50% or more of teachers consistently integrated the use of 21st Century Tools into the classroom." Thirty-eight (19.59%) administrators and teachers responded that "all teachers act as role models in the application of 21st Century Skills and tools into the classroom." The overall response to this question yielded 160 (81.96%) administrators and teachers that had a medium to high response for the use of 21st Century Tools.

Teachers felt very well informed about each type of educational technology. 151 (90.96%) of teachers rated themselves as Intermediate to Advance for the use of technology for instruction. But, when teachers specified how often 21st Century Technology Tools were integrated for instructional purposes into their classroom the majority of the responses fell at the extremes of the scale under Not at All with the exception of the usage of the computer itself which was used by students 75.6 % and teachers 93.2% of the time on a Daily or Weekly basis. Therefore when referring to computer usage, the impact of 21st Century Technology Tools training on the frequency of use in the classroom is clearly very substantial. These findings are reflected in research conducted by Coffland and Strickland (2004) who found a direct relationship between the type of teacher training and teacher instructional computer use. Willis, Thompson, and Sadera (1999) also found that technology competency is based on ongoing technology use across teacher preparation courses.

Research Question 2 Findings and Conclusions

Research Question 2 addressed the impact of 21st Century Tools on the context for learning. For the purpose of this study, the context for learning will be measured by looking at 21st Century Content and the integration of technology. Higher average scores indicate that the district are doing things and affecting the context for learning. One hundred twenty-one (61.42%) administrators and teachers believed that when students work towards mastery of core subject, their study included a significant amount of "21st Century Content taught in a 21st Century Context." Thirty-two (16.24%) administrators and teachers believed that "all instruction includes 21st Century Content taught in a 21st Century Context." The overall responses for this question was 153 (77.66%) in the

medium to high range. When addressing 21st Century Content within the schools, 122 (61.93%) of the administrators and teachers believed that the content in their school included "many relevant examples, settings and some original content, such as global awareness, civic and business literacy." Thirty-two of the teachers believed that "a significant amount of relevant examples, applications, settings and original content, and where applicable, 21st Century Content that is relevant to the economic needs." This combined overall to 154 (78.17%) of the administrators and teachers rating the 21st Century Content within their schools in the medium to high range. The majority of teachers, 156 (96.29%), believed that the integration of technology in their teaching had somewhat or extensively impacted their students learning in a positive way. Therefore, 21st Century Technology Tools have an elevated impact on the context for learning. These findings are similar to the findings of Lea, Clayton, Draude, and Barlow (2001) at Middle Tennessee State University who discovered: (a) The use of instructional technology positively affects student learning, (b) the use of instructional technology increases student interest and satisfaction, and (c) faculty's role and their ability to use instructional technology are major factors. Lemke (2008) also listed how the Technology Tools serve to add value to learning in five ways including: through real-world contexts for learning, connections to outside experts, visualization and analysis tools, scaffolds for problem solving, and opportunities for feedback, reflection, and revision.

Research Question 3 Findings and Conclusions

Research Question 3 was to determine if the training for technology skills had been implemented as planned. Administrators and teachers agreed that professional development often integrated the application of learning skills into teaching strategies

and occasionally integrated the application of contemporary context and content into teaching strategies. Teachers believed that computers had a high impact on student achievement. Intermediate was the choice of teachers when rating themselves on the use of technology for instruction. The majority felt very well-informed about different types of educational technology. When rating the effectiveness of different training formats they had experienced during the last three years to familiarize themselves with computer technology, the teachers stated that Saturday workshop, conference session (no hands-on), and university non-credit course were never used. Teachers felt that all forms of instructional methods or characteristics they had experienced while attending a technology-oriented training within the last three years were effective.

Hands-on skill attainment and lecture/hands-on combination were the most preferred instructional methods or characteristics for future trainings. The most preferred format to attend for future training experiences was university credit course. The majority of teachers chose to have other teachers as instructors as the method of training. The participants had no preference for a method/characteristic for future experiences. The most preferred training times were during a scheduled in-service day at the start of the school year and during a scheduled in-service day during the school year.

The specific Technology Dimensions were addressed during open response as well as focus groups. Technology Dimension I goal was that the school district will use research-proven strategies to provide home, school, and community environments conducive to our students achieving technological literacy by the end of the eighth grade and to raise the overall level of academic achievement in South Carolina (Appendix J). The district developed and maintained a networked environment to provide teachers and

students with opportunities to share resources and collaborate. Four technology coaches were assigned to different schools. Curriculum guides were updated and issued to teachers. Keyboarding instruction is implemented during elementary grades and keyboarding courses are offered during the middle school grades.

Technology Dimension II goal was that the school district and its' schools will provide curriculum development and professional development to increase the competency of all South Carolina educators so that research-proven strategies and the effective integration of instructional technology systems can be used to increase student achievement (Appendix J). The district required Technology Proficiency Certification of all teachers. Needs assessment surveys were administered to teachers and administrators. Evaluations were administered at the end of each professional development course. Four technology coaches were made available to schools as well as multiple technology classes, a list of professional development opportunities on the SCTLC (South Carolina: Teaching, Learning, Connecting) the Web portal, and KnowldegeNet with topics by subject, grade, etc.

Technology Dimension III goal was that the school district will use current and emerging technology to create learner-centered instructional environments that enhance academic achievement (Appendix J). The district made Internet access available for school websites from home, for example, Odysseyware, curriculum notebooks, KnowledgeNet and developed and maintained a networked environment to provide teachers and students with opportunities to share resources and collaborate. Interactive technology (Promethean Boards and CPS systems), with the content based on our curriculum guides, have been developed and provided to the teachers.

Technology Dimension IV goal was that the school district will increase student achievement through the use of technology, including assistive technology, by maximizing community involvement and community partnerships (Appendix J). The district established after-school hours at school media centers. The Parents of Preschoolers program and Adult Ed began providing training to the community. School websites are linked to teacher webpages as well as KnowledgeNet pages.

Technology Dimension V goal was that the school district will expand and support technology resources to assist educators and learners in meeting the state academic standards and help to seek out other funding sources (Appendix J). The district established a Technology Inventory Database. Multiple random surveys were given to teachers and administrators about standards. An upgrade plan was in place until budget cuts. The Information Management Services department is training constantly on the maintenance of the firewall. Decentralized backups on-site, at the district office and Cloud Based Services were established. The technology staff is constantly working with special services to increase web-based instruction and accessibility.

All five Technology Dimensions showed success at different levels. Changes in technology availability and budget cuts hindered some successes. These budget cuts continued across the board in 2010-2011 (Vogt, 2010). The overall objectives for each goal of the technology plan were met.

Research Question 4 Findings and Conclusions

Research Question 4 asked for the barriers and supports to the implementation of 21st Century Skills. The majority of administrators and teachers believed some administrators include the integration of 21st Century Skills as part of their overall vision

for student achievement, and some believed that administrators facilitated and directed a professional vision that encouraged the integration of 21st Century Tools and Skills into the curriculum. They also believed that all schools have implemented 21st Century Tools and have started to integrate 21st Century Skills, and 50% or more of students have access to environments that advanced 21st Century Skills.

Administrators and teachers did not agree on resource allocation. The majority of administrators believed that district resource allocation plans were structured to provide students, parents, teachers, and administrators with seamless access to 21st Century Tools and Technology in school, at home, and any other place where learning activities were envisioned. The majority of teachers believed educational planning and overall enterprise planning were occasionally aligned with technology planning, and resource planning adequately and substantively addressed and funded educational objectives.

The administrators and teachers did agree that system planning had some focus on the integration of 21st Century Tools into educational strategies, technology support was available on a regular basis, and technology was refreshed every five to seven years. And, the majority of administrators and teachers believed that much curriculum, educational objectives, and standards were aligned with assessment, included some 21st Century Skills, and focused on the integration of learning skills and 21st Century Tools into content and administrative processes.

When the survey respondents were asked to indicate how their school or district partnered with the community, administrators and teachers agreed that formal relationships developed between the school and the community, and community programs incorporated learning skills and 21st Century Tools. But, the business owners

believed that schools occasionally worked together with communities, and some students participated in community programs that helped them apply 21st Century Tools to their own learning.

The presence of a computer at home was the most prevalent support that helped teachers use technology in their instruction. The most common response when asked to describe a support that was most significant in making him/her successful and/or preventing him/her from integrating technology concerned access to computers or the Internet which was met with positive and negative responses. "An inadequate number of computers in the classroom" was chosen as a barrier to the use of technology in instruction. The top five responses from the teachers that responded listed the following as a support for their use of technology: (a) having a computer at home (90%), (b) having Internet at home (87%), (c) access to Internet in their classroom (87%), (d) being interested in using technology for classroom instruction (83%), and (e) having school policy that allows access to email (77%). All of these supports that motivate teachers can be classified as access, utilization, or support staff. The same motivations were published by Bitner and Bitner in 2002, and included appropriate training through professional staff development, supportive leadership, and access to plan and to present information.

The top six responses from the teacher that responded listed the following as barriers to their use of technology: (a) an inadequate number of computers in their classroom (79%), (b) not having enough time to explore new technology tools and applications (47%), (c) lack of ample funding for technology (32%), (d) lack of ample funding for technology related professional development (30%), (e) inadequate professional development in technology usage (27%), and (f) inadequate technology is

available for integration (27%). All of these responses can be classified as access, time, funding, or professional development. These parallel Brinkerhoff's (2006) research that identified the four main barriers to technology integrations as "resources, institutional and administrative support, training and experience, and attitudinal or personality factors" (p.1).

Suggestions

The results of this study provided information that should be used to guide district administrators in the improvement of the district. Respondents of the survey complained of a lack of ample funding (Questions 40 and 41 as well as focus group responses). Therefore, a study must be formulated to see if adequate or proper funding was allocated to the technology areas. The study should include the possibility of outside or flexible funding. The surveys yielded mediocre to lack of use or knowledge for integrating 21st Century Skills in the classroom (Questions 18, 33-36, 42, and 43 as well as focus group responses). More professional development that is user friendly may encourage motivation to learn and use technology in classrooms. During focus groups, the lack of follow-up after professional development was mentioned as a deterrent. Therefore, a study of the distribution of the technology support staff within the district as a source for questions for teachers after they begin to use their new-found knowledge should be initiated.

Future Study

During focus groups, a participant made an informed comment: "Students are in the web 2.0 world. Education is not…Talking about blogging and the social network, the collaborative software, and to keep up with the students and pique their interest,

educators are going to have to get into the web 2.0 resources. There's no doubt about it. I think the key to that is how these tools are going to be implemented. How are we going to teach the students to use them responsibly in school and outside of school and teachers, too?" (Anonymous, personal communication, November 16, 2010). This leads to several possible future studies. Multiple survey questions ask for teachers' opinions of student usage. The implementation of the same study with the inclusion of student surveys would give a more accurate picture of the district. The lack of data concerning South Carolina's readiness and use of 21st Century Skills leads to the need for a survey about the use of 21st Century Skills that focuses on all District Technology Directors within the state. Table 22 compared questions 32 and 34 where teachers rated the amount of student use of alternate technology and gave perceptions of the impact of alternate technology on student achievement. A study of the use of alternate technology in the classroom, for example, students' personal cell phones, iPods, etc., may yield a solution to the lack of ample funding that has been previously mentioned.

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Appendix A

Permission Letter 1 for Use of Survey

From: Deborah D Clark <clarkd@marshall.edu>
To: AMANDA MOSS <
CC: <deborah.clark@suddenlink.net>
Date: 10/20/2009 3:36 PM
Subject: Re: survey inquiry

Amanda,
I apologize for not getting back to you sooner, but as I explained over the phone, I check this email account only once a week or so now that I have completed my research. i am happy to give permission for you to use my survey, "West Virginia Teachers' Technology Tools and Use Survey" and if you need to talk to me further, please feel free to contact me via phone or email. I have included other contact information in my signature and wish you luck with your research. I would be interested to find out what your results are, so please keep me updated.
Debbie

Deborah D. Clark, Ed.D.
STEM Consultant
RR 1 Box 320
Hinton, WV 25951
H - 304.466.4920
M - 304.573.4920
deborah.clark@suddenlink.net

Appendix B

Permission Letter 2 for Use of Survey

From: SJSmith <SJSmith@tntech.edu> Wednesday - November 18, 2009 10:45 AM
To: AMANDA MOSS
Subject: Re: per our conversation

Attachments: Mime.822 (9 KB)

Congratulations on reaching this point of your doctoral program. As I indicated on the phone, I did not create the instrument. I simply modified it to reflect the current terminology, etc. of the time. You have my permission to use it (as far as my legal right to grant you permission carries).

Let me know if I can be of any other assistance.

Sandi Smith

--
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Tennessee Technological University
Box 5042
Cookeville, TN 38505

Telephone: 931.372.3207
Cell: 931.261.8601
Fax: 931.372.3439

"Excellence is the result of caring more than others think is wise; risking more than others think is safe; dreaming more than others think is practical; and expecting more than others think is possible" Author unknown

Appendix C

Permission Letter for Use of Survey from the Partnership for 21st Century Skills

Policies associated with using P21 copyrighted material.

1. You may reference the Partnership for 21st Century Skills without using the P21 logo, but if you use the P21 logo, it must be in association with the appropriate language describing the partnership (item a).

Language to describe the Partnership: The Partnership for 21st Century Skills is a national organization that advocates for 21st century readiness for every student. As the United States continues to compete in a global economy that demands innovation, P21 and its members provide tools and resources to help the U.S. education system keep up by fusing the three Rs and four Cs (critical thinking and problem solving, communication, collaboration, and creativity and innovation).

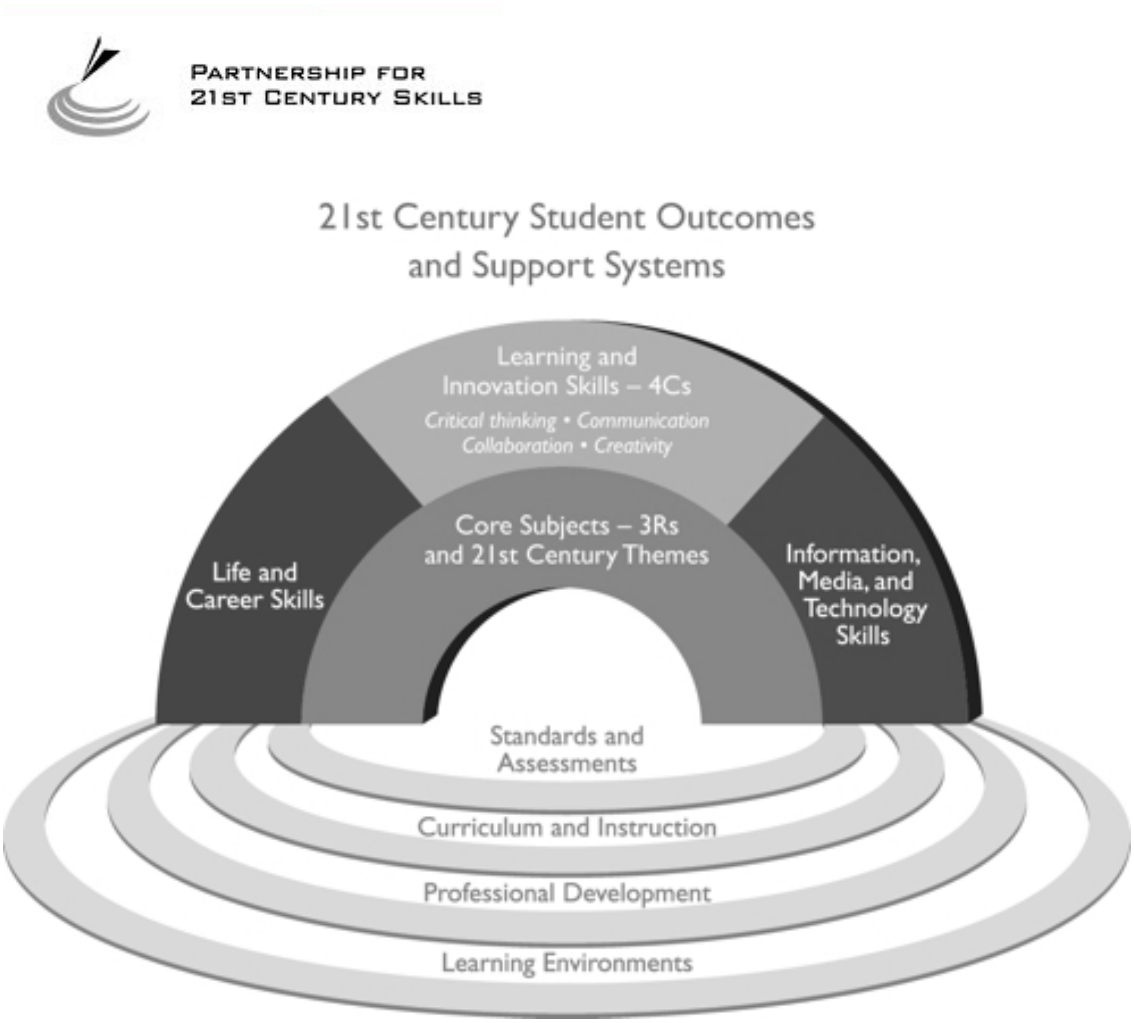
2. Use of P21 Framework and Framework graphic (Rainbow): Permission will be granted provided that the content remains unchanged and that attribution is given to the Partnership for 21st Skills. Again, the Framework or its representational images may not be used to endorse specific products or services.

3. The party using or referring to the Partnership's intellectual property will not represent themselves in a manner that can be interpreted as implying that they are an officially "certified" or endorsed Partnership consultant.

4. The Partnership for 21st Century Skills holds the right to restrict usage of any intellectual property if the Partnership finds that it is being used in an inappropriate manner.

Appendix D

Partnership for 21st Century Skills Graphic


Partnership for
21st Century Skills
21st Century Student Outcomes
and Support Systems
Learning and
Innovation Skills – 4Cs
Critical thinking • Communication
Collaboration • Creativity
Core Subjects – 3Rs
and 21st Century Themes
Life and
Career Skills
Information,
Media, and
Technology
Skills
Standards and
Assessments
Curriculum and Instruction
Professional Development
Learning Environments

Appendix E

Technology Tools, Use, and Training Survey

Technology Tools, Use, and Technology Survey

Please complete the following:

1. Age

20-30 31-40 41-50 51-60 61+

2. What is your current role in the education process?

Teacher
Local school administrator
District administrator
State Policymaker
Local Policymaker
Business Leader
Parent/Family Member
Higher Education Member
Education Researcher
Content Provider
Member of Youth-Serving Organization (ex. YMCA, Boys and Girls Club, etc)
Member of an Educational Organization or Professional Organization

3. Current Grade Level(s) (indicate all that apply)

PK K 1 2 3 4 5 6 7 8 9 10 11 12

4. Current Subject(s) (indicate all that apply)

Self-contained	English/Language arts	Math	Science
Social Studies	Foreign Language	Fine Arts	PE/Health
Special Education	Other		

5. How many years have you been employed as a full time teacher? (include this year)

0-5	6-10	11-15	16-20
21-25	26-30	31-35	36+

6. How many years have you been employed as a full time teacher **in this district**? (include this year)

0-5	6-10	11-15	16-20
21-25	26-30	31-35	36+

7. Place a check to indicate your highest earned degree.

B.A. or B.S. M.A. or M.S. Ed.S. or +45 Ed.D. or Ph.D.

8. Year earned_____

9. Please indicate your gender

Male Female

The following questions will address 21st Century Skills

21st Century Skills are defined by four main themes:

Digital Age Literacy—Today's Basics

- Basic, Scientific, and Technological Literacies
- Visual and Information Literacy
- Cultural Literacy and Global Awareness

Inventive Thinking—Intellectual Capital

- Adaptability/Managing Complexity and Self-Direction
- Curiosity, Creativity and Risk-taking
- Higher order thinking and sound reasoning

Interactive Communication—Social and Personal Skills

- Teaming and collaboration
- Personal and social responsibility
- Interactive communication

Quality, State-of-the-art Results

- Prioritizing, planning, and managing for results
- Effective use of real-world tools
- High quality results with real-world application

21st Century Context is achieved when teachers make content relevant to students lives, take the students out to the world, bring the world into the classroom, or create opportunities for students to interact with each other, with teachers and with other knowledgeable adults in authentic learning experiences.

21st Century Content is contains three main categories to include:

Global awareness

- Use 21st Century Skills to understand and address global issues
- Collaboration with other cultures and languages

Financial, economic, and business literacy—

- Understanding the role of the economy all the way down to personal financial choices.
- Ability to adapt with the nation's economic environment using 21st Century Skills

Civic literacy—

- Knowing how to be an informed and participatory citizen.
- Using 21st Century Skills to responsibly exercise rights and responsibilities at local, state, nation and global levels.

21st Century Tools are defined as information and communication technologies, such as computers, networking, and other technologies including audio, video, and other media and multimedia tools.

10. When students work towards mastery of core subjects, their study includes:

a. Only the core subjects

b. A significant amount of 21st Century content taught in a 21st Century context
c. All instruction includes 21st Century content taught in a 21st Century Context

11. What does instruction in your school look like?
    a. Instruction includes some contemporary content in a contemporary context.
    b. Instruction includes a significant amount of contemporary content in a contemporary context.
    c. Instruction always includes contemporary content in a contemporary context.

12. The 21st Century Content in your school includes:
    a. Some relevant examples and settings but no original content.
    b. Many relevant examples, settings and some original content, such as global awareness, civic and business literacy.
    c. A significant amount of relevant examples, applications, settings and original content, and where applicable, 21st Century Content that is relevant to the economic needs of your school.

13. How are learning skills incorporated into educational objectives and instruction?
    a. Learning skills are occasionally included in educational objectives primarily through curriculum and teaching strategies, and they are occasionally integrated into content.
    b. Learning skills are often included in educational objectives primarily through curriculum and teaching strategies, and they are often integrated into content.
    c. All educational objectives and teaching strategies emphasize the integration of learning skills and 21st Century tools, and these are used to enable students to effectively build content knowledge.

14. How are learning tools (such as computers, PDAs, etc) used in your school?
    a. 100% of students have access to traditional tools and 10% or more of teachers use 21st Century Tools.
    b. 100% of students have access to traditional tools, 50% or more of students have access to 21st Century Tools and 50% or more of teachers use 21st Century Tools.
    c. 100% of students have access to traditional tools, 100% of students have access to 21st Century Tools and 100% of teachers use 21st Century Tools.

15. How is assessment used in your school?
    a. Assessments focus on mastery of core subject content and are mostly pencil and paper based.
    b. Some assessments reflect the integration of learning skills, assessment

is more frequent and there is increased technology use in the assessment process.

c. All assessment is learner-centered, formative, content specific, ongoing and rooted in teaching strategies and most assessments use technology.

16. What is the role of teachers in your school?
    a. Teachers act as the provider of knowledge, occasionally use adaptable and flexible teaching strategies.
    b. Teachers act as subject matter experts, role models for teaching and learning.
    c. Teachers act as facilitators and partners for teaching and learning, all teachers use adaptable and flexible teaching strategies.

17. What is the role of professional development in your school?
    a. Professional development primarily supports content knowledge, administrative processes and professional development occasionally integrates learning skills into teaching strategies.
    b. Professional development often integrates the application of learning skills into teaching strategies and occasionally integrates the application of contemporary context and content into teaching strategies.
    c. Professional development supports the application of 21st Century Skills in teaching and learning strategies and classroom management practices, and all teachers use professional development to reinforce their content competency and integrate 21st Century Skills.

18. How do professionals use 21st Century Tools?
    a. 10% or more of teachers consistently integrate the use of 21st Century Tools into the classroom.
    b. 50% or more of teachers consistently integrate the use of 21st Century Tools into the classroom.
    c. All teachers act as role models in the application of 21st Century Skills and Tools into the classroom.

19. What is the role of administrators in setting the vision for the school?
    a. Administrators create visions for student achievement that focus on the mastery of content but few administrators promote a vision that incorporates the integration of 21st Century Skills and Tools into the curriculum.
    b. Some administrators include the integration of 21st Century Skills as part of their overall vision for student achievement and some administrators facilitate and direct a professional vision that encourages the integration of 21st Century Tools and Skills into the curriculum.
    c. All administrators include the integration of 21st Century Skills as part

of their overall vision for student achievement and act as role models for such integration, as well as create broad and inclusive plans that integrate 21st Century Skills into every aspect of learning, teaching and administrating.

20. How does your school meet the access needs of all students?
    a. Most schools have technology plans that provide access to 21st Century Tools.
    b. All schools have implemented 21st Century Tools and have started to integrate 21st Century Skills and 50% or more of students have access to environments that advance 21st Century Skills.
    c. 21st Century Tools are equitably distributed and there is access through homes, community centers, libraries and after-school programs, and 100% of students have access to environments that advance 21st Century Skills.

21. How are resources allocated?
    a. Technology planning primarily addresses infrastructure and equipment requirements but rarely addresses educational objectives. Educational and administrative planning requirements are not aligned with technology planning.
    b. Educational planning and overall enterprise planning are occasionally aligned with technology planning and resource planning adequately and substantively addresses and funds educational objectives.
    c. District resource allocation plans are structured to provide students, parents, teachers and administrators with seamless access to 21st Century Tools and technology in school, at home and any other place where learning activities are envisioned.

22. How is infrastructure and system support configured?
    a. System planning is focused on the acquisition of technology and traditional tools, technology support is erratic and technology is rarely updated.
    b. System planning has some focus on the integration of 21st Century Tools into educational strategies, technology support is available on a regular basis and technology is refreshed every five to seven years.
    c. Infrastructure plans are structured to provide students, parents, teachers and administrators with seamless access to 21st Century Tools and technology in school, there is a process for handling technology support, and all technology is refreshed every three to four years.

23. How do school administrators manage their school or district?
    a. Administrators demonstrate effective use of traditional management techniques but rarely use technology or data-driven decision-making.
    b. Administrators have started to use innovative management techniques and many administrators use 21st Century Tools and data-driven

decision making in management.

c. Administrators regularly use innovative management techniques, data-driven decision making and 21st Century Tools, and all administrators are proficient in the use of 21st Century Tools in the creation of curriculum and assessment.

24. How does policymaking reflect the importance of integrating 21st Century Skills into all aspects of education?
    a. Some curriculum, educational objectives and standards are aligned with assessment and focus on learning skills but mostly policymaking tends to focus more on core subject mastery and administrative processes.
    b. Much curriculum, educational objectives and standards are aligned with assessment and include some 21st Century Skills and focus on the integration of learning skills and 21st Century tools into content and administrative processes.
    c. All curriculum, educational objectives and standards are aligned with assessment and include 21st Century Skills and encourage the integration of 21st Century Skills into both content mastery and administrative processes.

25. How is your school or district evaluated for success?
    a. Schools are evaluated on student achievement in core subjects, administrators are evaluated based on their ability to create policies that meet district goals and some districts are evaluated on their professional development programs.
    b. Districts are evaluated on student achievement through the integration of learning skills and 21st Century Tools into core subjects, administrators begin to be evaluated on the incorporation of 21st Century Skills and the streamlining of administrative processes, and many districts are evaluated on their professional development programs.
    c. All schools and districts are evaluated on student achievement of 21st Century Skills, the systemic incorporation of 21st Century Skills, the efficiency of educational programs, and professional development programs that include 21st Century Skills.

26. How does your school or district partner with parents?
    a. Parents are apprised of a child's mastery in cores subjects and the school uses traditional tools to facilitate dialogue among parents and teachers.
    b. Parents work with teachers to evaluate their child's progress, some school use 21st Century Tools to facilitate dialogue and create ongoing communication systems between parents, teachers and students.
    c. Parents, students and teachers collaborate to create an education that includes the mastery of core subjects and 21st Century Skills, 21st

Century Tools are used to facilitate dialogue, and most parents have a mastery of 21st Century Tools.

27. How does your school or district partner with the community?
    a. Schools occasionally work together with communities and some students participate in community programs that help them apply 21st Century Tools to their own learning.
    b. Formal relationships begin to develop between the school and the community and community programs incorporate learning skills and 21st Century Tools.
    c. Community programs support learner mastery of 21st Century Skills and coordinate with school programs to promote strategies that reinforce 21st Century Skills.

28. What is the role of higher education in your school or district?
    a. K-12 and higher education occasionally work together to prepare students for success in higher education but rarely include 21st Century Skills.
    b. K-12 schools and higher education programs often work together to address student preparation for success in higher education and includes the application of 21st Century Skills.
    c. K-12 schools and higher education programs regularly work together to prepare students for college, including the integration of content and 21st Century Skills.

29. How does your school or district partner with Schools of Education?
    a. 10% or more of students in schools of education have ongoing mentoring with experience K-12 classroom teachers and administrators.
    b. 50% or more of students in the schools of education have ongoing mentoring with experienced K-12 classroom teachers, and the mentoring programs include a focus on 21st Century Skills.
    c. 100% of students in teacher preparation have ongoing mentoring with experienced K-12 classroom teachers and administrators, and programs integrate 21st Century Skills.

30. How does your school or district work with content providers?
    a. Content providers support core subject mastery and K-12 leaders look to them as a source for traditional learning tools and to align primary and supplementary resources to core academic standards.
    b. Content providers work with K-12 leaders to design 21st Century Tools and create some content and resources that include learning skills and 21st Century Tools.
    c. Content providers create content and resources that include standards with 21st Century Skills and education leaders work with content providers to develop aligned resources, assessment and curriculum

integrated with the appropriate 21st Century Tools and educational systems.

31. How does your school or district work with business leaders?
    a. K-12 and private sector partners rarely work together to address student preparation for the workforce but some businesses support education and encourage programs that implement technology.
    b. K-12 and private sector partners occasionally work together to address student preparation for the workforce and businesses support education and begin to encourage programs that promote 21st Century Skills.
    c. K-12 and private sector partners regularly work together to ensure student preparation for the workplace and the mastery of 21st Century Skills, and businesses regularly support educational programs that promote 21st Century Skills.

Questions 32-52 are for teachers who are currently in the classroom.

32. What impact does the following technology tools have on student achievement?

	No Impact	Moderate Impact	High Impact
Computer	1	2	3
Cell Phone	1	2	3
Classroom Response System (CPS)	1	2	3
Digital Camera	1	2	3
GIS System (GPS, etc.)	1	2	3
Handheld Computer (PDA, etc.)	1	2	3
iPod (other mp3 device)	1	2	3
Interactive Whiteboard Promethean Board	1	2	3
World Wide Web	1	2	3
Blog	1	2	3
Chat	1	2	3
Distance Learning (Virtual School, Moodel, KnowledgeNet, etc.)	1	2	3
Email	1	2	3
Instant Messages	1	2	3
Podcasts	1	2	3
Virtual Realities (Second Life,etc.)	1	2	3
Wikis	1	2	3

Video Conferencing	1	2	3
Database Software	1	2	3
Desktop Publishing Software	1	2	3
Presentation Software	1	2	3
Spreadsheet Software	1	2	3
Web Authoring Software	1	2	3
Word Processing Software	1	2	3
Audio Editing Software	1	2	3
Concept Mapping Software	1	2	3
Draw/Paint Software	1	2	3
Image Editing Software	1	2	3
Video Editing Software	1	2	3
Educational Software	1	2	3

33. For Instructional Purposes, how often do **YOU** use the following technology tools?

	Not at All	Less than once a month	Once a month	Several times a month	Once a week	Several times a week	Daily
Computer	1	2	3	4	5	6	7
Cell Phone	1	2	3	4	5	6	7
Classroom Response System (CPS)	1	2	3	4	5	6	7
Digital Camera	1	2	3	4	5	6	7
GIS System (GPS, etc.)	1	2	3	4	5	6	7
Handheld Computer (PDA, etc.)	1	2	3	4	5	6	7
iPod (other mp3 device)	1	2	3	4	5	6	7
Interactive Whiteboard Promethean Board	1	2	3	4	5	6	7
World Wide Web	1	2	3	4	5	6	7
Blog	1	2	3	4	5	6	7
Chat	1	2	3	4	5	6	7
Distance Learning (Virtual School, Moodel, KnowledgeNet, etc.)	1	2	3	4	5	6	7
Email	1	2	3	4	5	6	7
Instant Messages	1	2	3	4	5	6	7
Podcasts	1	2	3	4	5	6	7
Virtual Realities	1	2	3	4	5	6	7

(Second Life,etc.)							
Wikis	1	2	3	4	5	6	7
Video Conferencing	1	2	3	4	5	6	7
Database Software	1	2	3	4	5	6	7
Desktop Publishing Software	1	2	3	4	5	6	7
Presentation Software	1	2	3	4	5	6	7
Spreadsheet Software	1	2	3	4	5	6	7
Web Authoring Software	1	2	3	4	5	6	7
Word Processing Software	1	2	3	4	5	6	7
Audio Editing Software	1	2	3	4	5	6	7
Concept Mapping Software	1	2	3	4	5	6	7
Draw/Paint Software	1	2	3	4	5	6	7
Image Editing Software	1	2	3	4	5	6	7
Video Editing Software	1	2	3	4	5	6	7
Educational Software	1	2	3	4	5	6	7
Other (please list)							

34. For Instructional Purposes, how often do **YOUR STUDENTS** use the following technology tools?

	Not at All	Less than once a month	Once a month	Several times a month	Once a week	Several times a week	Daily
Computer	1	2	3	4	5	6	7
Cell Phone	1	2	3	4	5	6	7
Classroom Response System (CPS)	1	2	3	4	5	6	7
Digital Camera	1	2	3	4	5	6	7
GIS System (GPS, etc.)	1	2	3	4	5	6	7
Handheld Computer (PDA, etc.)	1	2	3	4	5	6	7
iPod (other mp3 device)	1	2	3	4	5	6	7
Interactive Whiteboard Promethean Board	1	2	3	4	5	6	7
World Wide Web	1	2	3	4	5	6	7
Blog	1	2	3	4	5	6	7
Chat	1	2	3	4	5	6	7

Distance Learning (Virtual School, Moodel, KnowledgNet, etc.)	1	2	3	4	5	6	7
Email	1	2	3	4	5	6	7
Instant Messages	1	2	3	4	5	6	7
Podcasts	1	2	3	4	5	6	7
Virtual Realities (Second Life, etc.)	1	2	3	4	5	6	7
Wikis	1	2	3	4	5	6	7
Video Conferencing	1	2	3	4	5	6	7
Database Software	1	2	3	4	5	6	7
Desktop Publishing Software	1	2	3	4	5	6	7
Presentation Software	1	2	3	4	5	6	7
Spreadsheet Software	1	2	3	4	5	6	7
Web Authoring Software	1	2	3	4	5	6	7
Word Processing Software	1	2	3	4	5	6	7
Audio Editing Software	1	2	3	4	5	6	7
Concept Mapping Software	1	2	3	4	5	6	7
Draw/Paint Software	1	2	3	4	5	6	7
Image Editing Software	1	2	3	4	5	6	7
Video Editing Software	1	2	3	4	5	6	7
Educational Software	1	2	3	4	5	6	7
Other (please list)							

35. For INSTRUCTIONAL PURPOSES, how often do **YOU** USE TECHNOLOGY for the following types of activities?

	Not at All	Less than once a month	Once a month	Several times a month	Once a week	Several times a week	Daily
Data Collection (calculator, CBL, CBR, GIS, handheld computer, probes, spreadsheet, etc.	1	2	3	4	5	6	7

Solving Real-World Problems (calculator, CBL, CBR, GIS, Google Apps, handheld computer, multimedia, probes, simulation, spreadsheet, videos, etc.)	1	2	3	4	5	6	7
Analyzing and/or Visualizing Data (calculator, CBL, CBR, GIS, Google Apps, handheld computer, simulation, spreadsheet, World Wide Web, etc.)	1	2	3	4	5	6	7
Graphical Presentation of Materials (AutoCAD, Google Apps, Hyperstudio, PowerPoint, Print Shop, etc.)	1	2	3	4	5	6	7
Webpage Design (FrontPage, Dreamweaver, etc.)	1	2	3	4	5	6	7
Conducting Research (CD-ROM, Internet, online database)	1	2	3	4	5	6	7
Taking Students on Virtual Field Trips/Virtual Tours	1	2	3	4	5	6	7
Collaboration (correspond with experts, authors, students from other schools, etc.)	1	2	3	4	5	6	7
Communication (online chats, online threaded discussions, online whiteboards, instant messaging, wikis, blogs, podcasts)	1	2	3	4	5	6	7
Basic Skill Development/Assessment (CompassLearning, Cornerstone, SkillsBank, CD-Rom games, Internet games, Accelerate Reader, Accelerated Math, etc.)	1	2	3	4	5	6	7
Locating Internet/Web Resources	1	2	3	4	5	6	7
Other (describe)							

36. For INSTRUCTIONAL PURPOSES, how often do **YOUR STUDENTS** USE TECHNOLOGY for the following types of activities?

	Not at All	Less than once a month	Once a month	Several times a month	Once a week	Several times a week	Daily
Data Collection (calculator, CBL, CBR, GIS, handheld computer, probes, spreadsheet, etc.	1	2	3	4	5	6	7
Solving Real-World Problems (calculator, CBL, CBR, GIS, Google Apps, handheld computer, multimedia, probes, simulation, spreadsheet, videos, etc.)	1	2	3	4	5	6	7
Analyzing and/or Visualizing Data (calculator, CBL, CBR, GIS, Google Apps, handheld computer, simulation, spreadsheet, World Wide Web, etc.)	1	2	3	4	5	6	7
Graphical Presentation of Materials (AutoCAD, Google Apps, Hyperstudio, PowerPoint, Print Shop, etc.)	1	2	3	4	5	6	7
Webpage Design (FrontPage, Dreamweaver, etc.)	1	2	3	4	5	6	7
Conducting Research (CD-ROM, Internet, online database)	1	2	3	4	5	6	7
Taking Students on Virtual Field Trips/Virtual Tours	1	2	3	4	5	6	7
Collaboration (correspond with experts, authors, students from other schools, etc.)	1	2	3	4	5	6	7
Communication (online chats, online threaded discussions, online whiteboards, instant messaging, wikis, blogs, podcasts)	1	2	3	4	5	6	7
Basic Skill Development/Assessment (CompassLearning, Cornerstone, SkillsBank, CD-Rom games, Internet games, Accelerate Reader, Accelerated Math, etc.)	1	2	3	4	5	6	7
Locating Internet/Web Resources	1	2	3	4	5	6	7
Other (describe)							

37. Briefly describe a technology-related assignment that you frequently ask your

students to complete.

38. SUPPORTS that help me use technology in my instruction are (check all that apply):

adequate number of computers in my classroom
adequate number of computers elsewhere in my school (computer lab, library/media center)
adequate technology is available for integration (calculators, scientific probes, handheld computers, etc.)
access to Internet in my classroom
access to Internet elsewhere in my school (computer lab, library/media center)
technology in my school is up-to-date
I have a computer at home
I have Internet at home
I am interested in using technology for classroom instruction
I have enough time to explore new technology tools and applications
technology supports my curriculum and does not create extra work/effort on my part
school policy allows access to e-mail
school policy allows access to communicate via blogs, wikis, and other social networking tools
school policy allows for adequate student/teacher use of technology
network storage capability exists at school
technology is a priority of school administration
technology is a priority of district administration
technology is a priority of school community
ample funding is designated for technology
ample funding is designated for technology related professional development
adequate professional development in technology usage
adequate professional development related to content specific technology integration
adequate follow-up to support technology integration
incentives are provided for participating in technology training
technical support available at school level
technical support available at district/regional/state/level
other (describe)

39. Looking back at the supports, briefly describe the one that is most significant in making you successful and/or preventing you from integrating technology.

40. BARRIERS that prevent me from using technology in my instruction are (check all

that apply):

inadequate number of computers in my classroom
inadequate number of computers elsewhere in my school (computer lab, library/media center)
inadequate technology is available for integration (calculators, scientific probes, handheld computers, etc.)
no access to Internet in my classroom
no access to Internet elsewhere in my school (computer lab, library/media center)
technology in my school is outdated
I do not have a computer at home
I do not have Internet at home
I am not interested in using technology for classroom instruction
I do not have enough time to explore new technology tools and applications
technology does not support my curriculum and does not create extra work/effort on my part
school policy does not allow access to e-mail
school policy does not allow access to communicate via blogs, wikis, and other social networking tools
school policy does not allow for adequate student/teacher use of technology
network storage capability does not exist at school
technology is not a priority of school administration
technology is not a priority of district administration
technology is not a priority of school community
ample funding is not designated for technology
ample funding is not designated for technology related professional development
inadequate professional development in technology usage
inadequate professional development related to content specific technology integration
inadequate follow-up to support technology integration
incentives are not provided for participating in technology training
technical support not available at school level
technical support not available at district/regional/state/level
other (describe)

41. Looking back at the barriers, briefly describe the one that is most significant in making you successful and/or preventing you from integrating technology.

42. How well informed do you feel about each of the following types of educational

technology?

	Not Well informed	Somewhat informed	fairly well informed	very well informed
Instructional software (floppies or CD-ROM)	1	2	3	4
Instructional television (includes Channel One/Cable in the Classroom, Video Portal)	1	2	3	4
Internet	1	2	3	4
E-mail	1	2	3	4
Interactive Whiteboard / Promethean Board	1	2	3	4
Scanner	1	2	3	4
Digital camera	1	2	3	4
Presentation systems (convertors or LCD panels/projectors)	1	2	3	4

43. Concerning the use of technology for instruction, do you consider yourself:

Beginner Intermediate Advanced

44. Please rate the effectiveness of the following training formats that you have experienced during the last three years to familiarize yourself with computer technology:

	Very effective	Effective	Ineffective	Never Used
In-service (full day)	3	2	1	0
In-service (half day)	3	2	1	0
After school workshop	3	2	1	0
Saturday workshop	3	2	1	0
Conference session (no hands-on)	3	2	1	0
Conference workshop (hands-on)	3	2	1	0
Instruction manual	3	2	1	0
On-line resources (web site)	3	2	1	0
University non-credit course	3	2	1	0
University credit course	3	2	1	0
Talk with other teachers	3	2	1	0
Self-study (hands-on)	3	2	1	0
Other_____	3	2	1	0

45. Please rate the effectiveness of the following instructional methods or characteristics that you have experienced while attending a technology-oriented training within the last three years:

	Very effective	Effective	Ineffective	Never Experienced
Lecture	3	2	1	0
Hands-on skill attainment	3	2	1	0
Lecture/Hands-on combination	3	2	1	0
Teleconference/Videoconference	3	2	1	0
Computer-based tutorial	3	2	1	0
Group Investigation	3	2	1	0
Individualized learning	3	2	1	0
Team learning (with at least one partner)	3	2	1	0
Video-taped lesson	3	2	1	0
Web-based tutorial (Internet)	3	2	1	0
Other_____ _____	3	2	1	0

46. Please indicate your preferences for each instructional method or characteristic when attending future technology-oriented training.

	Least Preferred			Most Preferred
Lecture	1	2	3	4
Hands-on skill attainment	1	2	3	4
Lecture/Hands-on combination	1	2	3	4
Teleconference/Videoconference	1	2	3	4
Computer-based tutorial	1	2	3	4
Group Investigation	1	2	3	4
Individualized learning	1	2	3	4
Team learning (with at least one partner)	1	2	3	4
Video-taped lesson	1	2	3	4
Web-based tutorial (Internet)	1	2	3	4
Other_____	1	2	3	4

47. Please indicate which formats you prefer to attend for future training experiences:

	Most Preferred		Least Preferred
In-service (full day)	3	2	1
In-service (half day)	3	2	1
After school workshop	3	2	1
Saturday workshop	3	2	1
Conference session (no hands-on)	3	2	1
Conference workshop (hands-on)	3	2	1
Instruction manual	3	2	1
On-line resources (web site)	3	2	1
University non-credit course	3	2	1
University credit course	3	2	1
Talk with other teachers	3	2	1
Self-study (hands-on)	3	2	1
Other_____	3	2	1

48. Please indicate your preference for each method/characteristic for future experiences:

	Least Preferred			Most Preferred
District Technology Staff	1	2	3	4
School District Staff	1	2	3	4
Building-level Administrators	1	2	3	4
Other Teachers	1	2	3	4
University/College Faculty	1	2	3	4
Software/Hardware Vendors (Sellers or Retailers)	1	2	3	4
Other (please indicate):_____	1	2	3	4

49. Please indicate your preference for each method/characteristic for future experiences:

	Least Preferred			Most Preferred
In your classroom	1	2	3	4
In another classroom within your school	1	2	3	4
In your school's computer lab	1	2	3	4
In your school's teacher center	1	2	3	4
another school within the district	1	2	3	4
On a nearby College/University campus	1	2	3	4
At a State Department of Education Site	1	2	3	4

Other (please describe):_____ 1 2 3 4

50. Please indicate your preference for each method/characteristic for future experiences:

	Least Preferred			Most Preferred
During the summer break	1	2	3	4
During a scheduled in-service day at the start of the school year	1	2	3	4
During a scheduled in-service day during the school year	1	2	3	4
During a scheduled in-service day at the end of the school year	1	2	3	4
In the morning-before the regular school day begins	1	2	3	4
After a regular school day	1	2	3	4
Half-day (3 hours) on Saturday morning	1	2	3	4
Full-day (6 hours) on Saturday	1	2	3	4

51. To what degree has integrating technology into your teaching positively impacted student learning?

None at all very little somewhat extensively

52. Please provide examples of how you integrate technology into your teaching to positively impact student learning.

Appendix F
Permission Letter to Conduct Survey

Trad Robinson

December 15, 2010

Dear Mrs. Amanda Moss,

Based on my review of your research proposal, I give permission for you to conduct the study entitled "A Study of Teachers Using 21st Century Tools in a Rural South Carolina School District" within the [redacted] School District. As part of this study, I authorize you to invite members of my organization, whose names and contact information I will provide, to participate in the study as subjects. Their participation will be voluntary and at their own discretion.

Sincerely,

Trad Robinson, Director of Technology
[redacted] School District

Appendix G

Survey Cover Letter

Greetings:

My name is Amanda Moss, and I am currently a doctoral student at Gardner Webb University. I am writing to ask your help in a study of teachers using 21st century tools being conducted as part of the requirements for completing my doctorate. Your opinions will be very important to the success of the study.

You are being asked to complete a survey regarding the technology tools used by students and the quality or types of usage by teachers and students as defined by the recommendations of the Partnership for 21st Century Skills. Secondly, the study examines the barriers and supports, as well as training, that will impact teacher and student usage within the curriculum. Your answers are completely confidential. Data will be reported in aggregate form only with no identification of individuals.

Please answer all questions as honestly and accurately as possible. Please accept my gratitude in advance for your cooperation and timely participation in this research study.

Click on the link below to begin your survey.

http://www.zoomerang.com/Survey/WEB22A33Q2P6WN

Sincerely,
Amanda E. Moss

Appendix H

Initial Reminder Letter

Greetings Teachers:

I know at some point in your career you needed someone to help you along the way....that is what I am asking of you now. A couple of weeks ago I sent you a survey dealing with students and teachers using 21st century tools. If you took the survey, **thank you very much**, if you did not will you please take the time to do this now? Thanks and I hope you have a great school year.

Be assured that my research is based on responses only and not on the individuals responding. Your answers are completely confidential. Data will be reported in aggregate form only with no identification of individuals. Please answer all questions as honestly and accurately as possible.

Click on the link below to begin your survey.

http://www.zoomerang.com/Survey/WEB22A33Q2P6WN

Sincerely,

Amanda E. Moss, Ed.S

Appendix I

Final Reminder Letter

Greetings Teachers:

Several weeks ago I sent you a survey dealing with dealing with students and teachers using 21st century tools. If you took the survey**, thank you very much**, if you did not will you please take the time to do this now? I will be closing the survey soon and want to give everyone a chance to reply.

Be assured that my research is based on responses only and not on the individuals responding. Therefore, it is so extremely important that you give me your most honest responses to all of the survey items. All responses will remain confidential.

Please click on the link below to start the survey

http://www.zoomerang.com/Survey/WEB22A33Q2P6WN

Thank you again.

Sincerely,

Amanda E. Moss, Ed.S

Appendix J

District Technology Plan

TECHNOLOGY DIMENSION 1

TECHNOLOGY DIMENSION I--OPERATIONAL PLAN

I. OBJECTIVES AND STRATEGIES

GOAL: XXXXXXXX School District will use research-proven strategies to provide home, school, and community environments conducive to our students achieving technological literacy by the end of the eighth grade and to raise the overall level of academic achievement in South Carolina.

OBJECTIVES	STRATEGIES
1.1 Students will use technology to acquire and demonstrate communication, collaboration and engagement skills that are aligned with state standards across the curriculum and will thereby increase their level of academic achievement.	A. Provide opportunities and resources to schools to facilitate the development and implementation of effective communication and collaboration skills using technology in the core content areas. B. Recognize and promote best practices that successfully integrate technology, including assistive technology, into the curriculum, i.e. group projects, oral presentations. C. Provide appropriate accommodations for students with special needs when using, teaching and testing technology.
1.2 Students will engage in authentic learning activities that are aligned with the state standards and that integrate technology, including assistive technology, into the core content.	A. Develop technology-enhanced activities aligned with state standards in the core content areas. B. Provide the services of school technology coaches to conduct staff development for schools, teachers, and administrators, and help ensure that lessons plans and activities incorporate a variety of technologies, including those appropriate for students with special needs. C. Update all XXXXXXXX School District curriculum guides to include authentic learning activities that are aligned with state standards.

I. OBJECTIVES AND STRATEGIES

GOAL: XXXXXXXX School District will use research-proven strategies to provide home, school, and community environments conducive to our students achieving technological literacy by the end of the eighth grade and to raise the overall level of academic achievement in South Carolina.

OBJECTIVES	STRATEGIES
1.3 Students will select the appropriate tools to complete authentic, real-life multidisciplinary tasks.	A. Create and use lesson activities in which students employ a variety of technology tools, including assistive technology, to complete authentic multidisciplinary tasks. B Provide all students, including those with special needs, access to a range of high and low technology solutions, including software, peripherals and other tools to increase student communication, participation and collaboration.
1.4 Students will demonstrate technology proficiency by the end of the eighth grade.	A. Research and develop technology benchmarks for students at grades third, fifth, eight, and eleventh grades. B. Develop and measure student technology proficiency by using various and appropriate assessment procedures and methods. C. Provide all students, including those with special needs, access to a full range of technology solutions, including software, peripherals and other tools to increase student communication, participation and collaboration. D. Begin keyboarding instruction during the elementary grades to provide adequate instructional time to develop technology productivity skills during the middle school grades.
1.5 XXXXXXXX School District will provide students with an enhanced learning environment through technological tools, including assistive technology, that are designed to promote high academic achievement.	A. Establish school and community learning environments that enable students to use technology for real-world problem solving and research. B. Integrate state grade-level technology standards into the curriculum to enable students to fully participate and function in today's information- rich global society.

TECHNOLOGY DIMENSION II--OPERATIONAL PLAN

I. OBJECTIVES AND STRATEGIES

GOAL: XXXXXXXX School District and its' schools will provide curriculum development and professional development to increase the competency of all South Carolina educators so that research-proven strategies and the effective integration of instructional technology systems can be used to increase student achievement.

OBJECTIVES	STRATEGIES
2.1 XXXXXXXX School District will enable educators to achieve and demonstrate proficiency in integrating state-recommended instructional technology standards (ISTE NETS-A, ISTE NETS-S, and ISTE NETS-T) into their specific area of professional practice to increase student achievement.	A. Encourage an initial teacher certification process that requires demonstration of proficiency in integrating instructional technology standards. B. Adopt a process that requires teachers to demonstrate ongoing proficiency in integrating instructional technology standards. C. Include in district technology plans a professional development program that provides a guide for teachers to progress from their current levels of ability in using technology, including appropriate assistive technology, to full proficiency. D. Require district and school administrators to demonstrate technology proficiencies based upon the state-recommended standards for administrators (ISTE NETS-A).
2.2 XXXXXXXX School District will provide the schools with multidimensional technology leadership whose focus is to ensure that technology is making a significant instructional and administrative impact for students, teachers, and administrators.	A. Provide the services of technology coaches to assist with basic technology skills and the integration of the technology into classroom instruction in every school. B. Assure that teachers in their classrooms, with special emphasis on helping administrators, teachers, and students meet the state-recommended technology standards (ISTE NETS-A, ISTE NETS-T, ISTE NETS-S) as well as helping students to meet the state's content standards in all areas.

I. OBJECTIVES AND STRATEGIES

GOAL: XXXXXXXX School District and its' schools will provide curriculum development and professional development to increase the competency of all South Carolina educators so that research-proven strategies and the effective integration of instructional technology systems can be used to increase student achievement.

OBJECTIVES	STRATEGIES
2.3 XXXXXXXX School District will provide schools with information and training in technology integration so that teachers can use research-based best-practice instructional methods throughout the curriculum.	A. Offer professional development activities and training in a variety of ways (i.e., on-site, off-site, on-line, self-paced, and combinations of these methods) to address the technology needs of staff, paying special attention to high- need schools and schools serving economically disadvantaged populations, including students with special needs. B. Provide a list of professional development opportunities on the SCTLC (South Carolina: Teaching, Learning, Connecting) Web portal at http://www.sctlc.com and publicize other recognized professional opportunities for educators. C. Provide professional development opportunities focused on aligning state technology standards with state content standards. D. Develop alliances with subject, grade, or position-specific professional organizations to promote technology integration throughout the K-12 curriculum. E. Increase the availability of technology professional development tools to teachers: access to laptop computers and presentation devices, Internet access at the classroom level, interactive on-line access to state curriculum standards and lesson plans, access to Web-based and/or CD-ROM-based training opportunities, and access to state-of-the art training centers in their particular geographic areas.

I. OBJECTIVES AND STRATEGIES

GOAL: XXXXXXXX School District and its' schools will provide curriculum development and professional development to increase the competency of all South Carolina educators so that research-proven strategies and the effective integration of instructional technology systems can be used to increase student achievement.

OBJECTIVES	STRATEGIES
2.4 XXXXXXXX School District will assess the overall effectiveness of professional development in the area of instructional technology standards and the impact of technology on student achievement.	A. Establish developmental levels of teacher technology proficiency. B. Incorporate instructional technology assessment into current teacher and administrator evaluation processes. C. Administer a district wide needs assessment to teachers and administrators to determine current levels and types of professional development that must be offered. D. Administer evaluations to determine the effectiveness and impact of the professional development offered to teachers and administrators. E. Encourage teachers to include lessons in their portfolios showing examples of their students' work and documenting use of technology in their classrooms.

TECHNOLOGY DIMENSION III--OPERATIONAL PLAN

I. OBJECTIVES AND STRATEGIES

GOAL: The XXXXXXXX School District will use current and emerging technology to create learner-centered instructional environments that enhance academic achievement.

OBJECTIVES	STRATEGIES
3.1 The XXXXXXXX School District will develop a technology framework that addresses the steps necessary to create a technology-rich environment that will foster increased achievement by all students, including those with special needs.	A. Ensure that curricular design, instructional strategies, and learning environments integrate appropriate technologies (including the range of assistive technology options) to significantly impact teaching and learning. B. Facilitate the use of technologies to support and enhance instructional methods (including the use of hardware, software, and assistive technology) that develop higher-level thinking, decision-making, and problem-solving skills.
3.2 The XXXXXXXX School District and the schools will provide teachers with the technology resources, including assistive technology, necessary to increase academic achievement.	A. Provide teachers with access to knowledgeable personnel, productivity tools, on-line services, media-based instructional materials, and primary sources of data in settings that enrich and extend teaching goals. B. Develop and implement the Classroom Performance System to provide teachers the ability to increase the frequency of normative assessment allowing for greater individualized instruction and increasing the amount content provided to students. C. Continue to fine-tune the implementation of the Measures of Academic Progress system by providing ongoing staff development and modifying curriculum guides to include DesCartes information.

I. OBJECTIVES AND STRATEGIES

GOAL: The XXXXXXXX School District will use current and emerging technology to create learner-centered instructional environments that enhance academic achievement.

OBJECTIVES	STRATEGIES
3.3 The XXXXXXXX School District and the schools will provide students with access to current and emerging technology resources that will extend their learning beyond the traditional classroom setting and schedule.	A. Provide students with access to technology, on-line services, and media-based instructional materials, allowing them to select appropriate tools that will enrich and extend their learning. B. Develop a distance learning system to provide secondary school with increased course offerings thus maximizing use of instructional personnel C. Develop online general long-range plans for each grade level and course. D. Maintain teacher web pages that contain detailed course information such as assignments, content information, and completion dates.
3.4 The XXXXXXXX School District will provide and support a variety of multimedia equipment and software for teaching and learning.	A. Increase the number of classrooms with LCD projectors that serve as a central component allowing teachers to engage the whole class using other instructional technology components. B. Establish a system for identifying, specifying, prioritizing, and managing equipment for multimedia development in direct support of curricular and professional development objectives. C. Fully implement the United Streaming video services. D. Fully utilize the DELC center as an instructional resource.

TECHNOLOGY DIMENSION IV--OPERATIONAL PLAN

I. OBJECTIVES AND STRATEGIES

GOAL: XXXXXXXX School District will increase student achievement through the use of technology, including assistive technology, by maximizing community involvement and community partnerships.

OBJECTIVES	STRATEGIES
4.1 XXXXXXXX School District will establish community technology partnerships and collaborations by providing tools, resources, and training that support student learning.	A. Form district-community partnerships to provide students with real-world and school-to-career experiences in the use of technology, including assistive technology, that enhance academic achievement. B Provide the training and materials to help parents improve their children's achievement by providing online and telephone access to transcript, daily grades and attendance, and discipline information. C. Provide recognition programs or incentives for partnerships showing impact. D. Identify community collaborations and write technology grants to develop and fund the use of technology to improve teaching and learning.
4.2 XXXXXXXX School District will provide after-hours training and community access to labs, media centers, and classrooms.	A. Provide schedules for access to facilities for after-hours assistive technology training for students, parents, teachers, and community members. B. Host school technology nights and parent workshops using instructional technologies.
4.3 XXXXXXXX School District will expand efforts to connect schools and teachers with parents and students, promote meaningful parental involvement, and foster increased communication so that parents are able to reinforce the instruction their child receives at school.	A. Provide teachers professional development to provide parents access to school information regarding their child. B. Expand administrator, teacher and student use of SASI and its capabilities to include online absences and grades. C. Partner with other school districts as well as community entities to collaborate in order to

I. OBJECTIVES AND STRATEGIES

GOAL: XXXXXXXX School District will increase student achievement through the use of technology, including assistive technology, by maximizing community involvement and community partnerships.

OBJECTIVES	STRATEGIES
	provide assistive technology demonstration, loan, and assessment for students with special needs. D. Develop online general long-range plans for each grade level and course. E. Maintain teacher web pages that contain detailed course information such as assignments, content information, and completion dates.

TECHNOLOGY DIMENSION V--OPERATIONAL PLAN

I. OBJECTIVES AND STRATEGIES

GOAL: XXXXXXXX School District will expand and support technology resources to assist educators and learners in meeting the state academic standards. Seek out other funding sources.

OBJECTIVES	STRATEGIES
5.1 XXXXXXXX School District will ensure that all teachers and students have the required instructional technology resources and those resources are easily accessible and fully operational.	A. Maintain a comprehensive inventory that includes all instructional and non-instructional technology. B. Survey teachers, students, and district personnel to understand their needs and expectations of instructional technology. C. Develop a systematic upgrade plan as part of an overall district technology plan to provide new instructional technology or replace outdated and incompatible equipment and software. D. Implement and evaluate the effectiveness of the systematic upgrade plan. E. Develop an obsolescence plan to recycle outdated and incompatible equipment and software. F. Implement the obsolescence plan. G. Evaluate the effectiveness of the obsolescence plan.
5.2 XXXXXXXX School District will ensure that their schools have an integrated, secure network infrastructure with bandwidth capacity to support fully converged networks that allow for communication, data collection and distribution, and distance learning.	A. Increase the knowledge of the technical staff in the maintenance of the network firewall. B. Establish a system for identifying, specifying, prioritizing, and managing equipment for multimedia development in direct support of curricular and professional development objectives. C. Ensure the installation, maintenance, and support of multimedia-capable teacher stations in classrooms including data projectors to support large-group instruction. D. Research and implement an integrated network infrastructure capable of utilizing all distribution modules. E. Install and maintain networks, virus protection, and Internet filtering and monitoring according to industry standards.

I. OBJECTIVES AND STRATEGIES

GOAL: XXXXXXXX School District will expand and support technology resources to assist educators and learners in meeting the state academic standards. Seek out other funding sources.

OBJECTIVES	STRATEGIES
	F. Develop a vision for a multimedia infrastructure designed to support instruction
5.3 XXXXXXXX School District will provide qualified technical staff, including one networking engineer per WAN or per ten LANs, one networking technician per 5 LANS, one district web editor, one instructional database operator, additional SASI support, and one end- user support per five to eight hundred users.	A. Develop district minimum staffing requirements and job descriptions, with a salary schedule comparable to adjacent districts, for the positions of one networking engineer per WAN or per ten LANs, one networking technician per 5 LANS, one district web editor, one instructional database operator, additional SASI clerks for schools, and one end- user support technician per five to eight hundred users B. Appoint a district network manager who will lead a committee in identifying and evaluating network management tools that will meet the needs of the district.
5.4 XXXXXXXX School District will implement a disaster recovery plan for all points of failure in LANs and WANs, including redundant data storage, robust automated backup, and immediate hardware recovery.	A. Ensure that disaster recovery plans are included in the district technology plan. B. Ensure that schools will have electrical distribution systems that provide isolated circuits in all classrooms and redundant power sources for mission-critical equipment. C. Implement a district management application that monitors bandwidth on the LAN and WAN and provides network failure alarms that can be accessed remotely.
5.5 XXXXXXXX School District will increase their ability to design web pages and web-based instruction that are accessible to students and staff with special needs in accordance with Section 508 of the Rehabilitation Act of 1973 as amended by the Workforce Improvement Act of 1998.	A. Provide training in basic web page accessibility principles to staff, teachers—and, when appropriate, students—who design web pages as part of the curriculum.

Appendix K

Question 33 Table

	N =	Not at All	Less than once a month	Once a month	Several times a month	Once a week	Several times a week	Daily	Mean
Computer	176	1%	3%	1%	2%	2%	7%	84%	6.58
Cell Phone	176	58%	5%	1%	2%	2%	4%	28%	3.1
Classroom Response System (CPS)	174	64%	7%	5%	13%	5%	4%	2%	2.07
Digital Camera	176	35%	20%	6%	18%	8%	7%	6%	2.91
GIS System (GPS, etc.)	170	82%	4%	5%	4%	2%	3%	0%	1.48
Handheld Computer (PDA, etc.)	172	82%	3%	5%	3%	0%	2%	5%	1.58
iPod (other mp3 device)	175	78%	3%	3%	4%	2%	5%	5%	1.81
Interactive Whiteboard	173	42%	1%	2%	3%	2%	7%	43%	4.14
Promethean Board	175	27%	1%	2%	2%	2%	6%	60%	5.1
World Wide Web	173	10%	3%	5%	6%	8%	13%	55%	5.6
Blog	173	83%	5%	2%	3%	5%	1%	1%	1.47
Chat	174	85%	5%	2%	2%	3%	3%	2%	1.47
Distance Learning (Virtual School, Moodel, KnowledgeNet, etc.)	175	59%	7%	11%	6%	9%	6%	2%	2.26
Email	174	20%	7%	3%	5%	2%	2%	61%	5.14
Instant Messages	172	77%	5%	4%	3%	1%	2%	8%	1.81
Podcasts	173	81%	5%	4%	6%	1%	2%	1%	1.49
Virtual Realities (Second Life,etc.)	172	82%	5%	6%	5%	1%	0%	1%	1.4
Wikis	171	81%	5%	4%	5%	3%	1%	1%	1.5
Video Conferencing	174	85%	5%	5%	3%	0%	1%	1%	1.34
Database Software	168	45%	6%	8%	8%	9%	9%	15%	3.2
Desktop Publishing Software	172	27%	6%	12%	10%	13%	12%	20%	3.92
Presentation Software	173	22%	5%	11%	14%	13%	16%	19%	4.15
Spreadsheet Software	167	37%	11%	13%	13%	9%	6%	11%	3.08
Web Authoring Software	169	71%	10%	6%	3%	2%	3%	5%	1.82
Word Processing Software	168	13%	1%	4%	9%	10%	18%	45%	5.35
Audio Editing Software	169	68%	8%	6%	8%	4%	2%	4%	1.95
Concept Mapping Software	168	60%	7%	9%	10%	7%	5%	2%	2.2
Draw/Paint Software	169	59%	12%	9%	5%	6%	2%	7%	2.2
Image Editing Software	171	59%	11%	12%	7%	4%	1%	6%	2.11
Video Editing Software	170	76%	4%	6%	5%	5%	1%	3%	1.75
Educational Software	167	19%	4%	10%	13%	12%	10%	32%	4.54

Appendix L

Question 34 Table

	N =	Not at All	Less than once a month	Once a month	Several times a month	Once a week	Several times a week	Daily	Mean
Computer	168	6%	4%	6%	8%	16%	31%	29%	5.32
Cell Phone	168	80%	3%	2%	1%	0%	0%	14%	1.96
Classroom Response System (CPS)	165	70%	6%	5%	9%	2%	4%	4%	1.97
Digital Camera	167	66%	8%	9%	7%	2%	2%	6%	1.99
GIS System (GPS, etc.)	165	90%	1%	2%	2%	1%	2%	2%	1.37
Handheld Computer (PDA, etc.)	166	89%	4%	1%	2%	2%	0%	2%	1.31
iPod (other mp3 device)	163	79%	2%	2%	2%	4%	2%	9%	1.93
Interactive Whiteboard	168	41%	2%	4%	6%	4%	14%	29%	3.9
Promethean Board	167	25%	2%	4%	7%	8%	15%	39%	4.74
World Wide Web	167	22%	6%	7%	10%	16%	17%	22%	4.35
Blog	164	85%	3%	3%	4%	0%	2%	3%	1.48
Chat	166	87%	2%	2%	3%	1%	2%	3%	1.47
Distance Learning (Virtual School, Moodel, KnowledgNet, etc.)	166	75%	7%	6%	5%	2%	2%	3%	1.66
Email	166	69%	4%	6%	4%	4%	3%	10%	2.17
Instant Messages	163	86%	2%	2%	2%	0%	2%	5%	1.55
Podcasts	163	85%	4%	4%	4%	2%	1%	1%	1.41
Virtual Realities (Second Life, etc.)	163	86%	4%	3%	4%	1%	1%	1%	1.38
Wikis	163	84%	6%	3%	5%	0%	0%	2%	1.39
Video Conferencing	166	87%	7%	2%	3%	1%	0%	0%	1.25
Database Software	166	66%	6%	8%	6%	4%	5%	5%	2.11
Desktop Publishing Software	167	46%	12%	11%	12%	7%	5%	7%	2.62
Presentation Software	166	48%	11%	11%	11%	9%	5%	5%	2.57
Spreadsheet Software	166	69%	7%	8%	5%	6%	2%	3%	1.92
Web Authoring Software	159	79%	8%	3%	5%	3%	1%	1%	1.52
Word Processing Software	165	30%	9%	15%	15%	12%	7%	12%	3.41
Audio Editing Software	161	83%	7%	4%	2%	3%	1%	0%	1.37
Concept Mapping Software	163	72%	10%	6%	6%	4%	1%	1%	1.64
Draw/Paint Software	169	62%	12%	9%	7%	3%	4%	3%	2.02
Image Editing Software	158	78%	7%	6%	5%	1%	1%	2%	1.54
Video Editing Software	162	85%	6%	3%	2%	2%	1%	1%	1.35
Educational Software	164	38%	9%	9%	9%	15%	7%	13%	3.24

Appendix M

Question 35 Table

	N=	Not at All	Less than once a month	Once a month	Several times a month	Once a week	Several times a week	Daily	Mean
Data Collection (calculator, CBL, CBR, GIS, handheld computer, probes, spreadsheet, etc.)	166	20%	10%	8%	14%	7%	16%	25%	4.27
Solving Real-World Problems (calculator, CBL, CBR, GIS, Google Apps, handheld computer, multimedia, probes, simulation, spreadsheet, videos, etc.)	165	14%	8%	9%	15%	8%	19%	27%	4.61
Analyzing and/or Visualizing Data (calculator, CBL, CBR, GIS, Google Apps, handheld computer, simulation, spreadsheet, World Wide Web, etc.)	165	16%	7%	10%	13%	11%	16%	27%	4.52
Graphical Presentation of Materials (AutoCAD, Google Apps, Hyperstudio, PowerPoint, Print Shop, etc.)	165	15%	9%	7%	18%	11%	19%	21%	4.39
Webpage Design (FrontPage, Dreamweaver, etc.)	164	65%	12%	8%	8%	2%	2%	3%	1.88
Conducting Research (CD-ROM, Internet, online database)	162	19%	9%	9%	15%	9%	22%	17%	4.17
Taking Students on Virtual Field Trips/Virtual Tours	160	44%	16%	13%	16%	8%	3%	0%	2.37
Collaboration (correspond with experts, authors, students from other schools, etc.)	161	45%	14%	11%	12%	6%	6%	6%	2.63
Communication (online chats, online threaded discussions, online whiteboards, instant messaging, wikis, blogs, podcasts)	162	56%	8%	9%	10%	6%	5%	6%	2.39
Basic Skill Development/Assessment (CompassLearning, Cornerstone, SkillsBank, CD-Rom games, Internet games, Accelerate Reader, Accelerated Math, etc.)	164	30%	10%	7%	13%	11%	15%	14%	3.63
Locating Internet/Web Resources	165	15%	7%	5%	13%	8%	22%	30%	4.79

Appendix N

Question 36 Table

	N=	Not at All	Less than once a month	Once a month	Several times a month	Once a week	Several times a week	Daily	Mean
Data Collection (calculator, CBL, CBR, GIS, handheld computer, probes, spreadsheet, etc.	164	38%	10%	8%	10%	7%	11%	16%	3.36
Solving Real-World Problems (calculator, CBL, CBR, GIS, Google Apps, handheld computer, multimedia, probes, simulation, spreadsheet, videos, etc.)	165	32%	8%	7%	14%	7%	13%	19%	3.72
Analyzing and/or Visualizing Data (calculator, CBL, CBR, GIS, Google Apps, handheld computer, simulation, spreadsheet, World Wide Web, etc.)	163	34%	8%	6%	18%	8%	9%	17%	3.54
Graphical Presentation of Materials (AutoCAD, Google Apps, Hyperstudio, PowerPoint, Print Shop, etc.)	163	38%	14%	9%	15%	10%	7%	7%	2.94
Webpage Design (FrontPage, Dreamweaver, etc.)	162	78%	6%	3%	7%	2%	2%	2%	1.6
Conducting Research (CD-ROM, Internet, online database)	164	34%	13%	12%	15%	10%	10%	6%	3.08
Taking Students on Virtual Field Trips/Virtual Tours	161	57%	11%	7%	15%	4%	5%	1%	2.16
Collaboration (correspond with experts, authors, students from other schools, etc.)	157	64%	14%	7%	7%	3%	3%	2%	1.88
Communication (online chats, online threaded discussions, online whiteboards, instant messaging, wikis, blogs, podcasts)	160	70%	8%	4%	7%	4%	3%	4%	1.91
Basic Skill Development/Assessment (CompassLearning, Cornerstone, SkillsBank, CD-Rom games, Internet games, Accelerate Reader, Accelerated Math, etc.)	163	36%	9%	8%	11%	14%	13%	9%	3.34
Locating Internet/Web Resources	161	28%	11%	10%	14%	11%	12%	14%	3.64

Appendix O

Question 32 Table

	N =	No Impact	Moderate Impact	High Impact	Mean
Computer	176	1%	27%	72%	2.72
Cell Phone	175	55%	26%	19%	1.64
Classroom Response System (CPS)	171	28%	46%	26%	1.98
Digital Camera	175	26%	54%	20%	1.94
GIS System (GPS, etc.)	169	65%	28%	7%	1.41
Handheld Computer (PDA, etc.)	168	61%	26%	13%	1.52
iPod (other mp3 device)	167	52%	31%	17%	1.65
Interactive Whiteboard	175	11%	18%	71%	2.6
Promethean Board	174	4%	17%	79%	2.75
World Wide Web	173	3%	21%	76%	2.73
Blog	169	59%	35%	6%	1.47
Chat	169	63%	29%	8%	1.44
Distance Learning (Virtual School, Moodel, KnowledgeNet, etc.)	173	31%	35%	34%	2.02
Email	173	25%	36%	39%	2.13
Instant Messages	171	60%	29%	11%	1.51
Podcasts	169	51%	34%	15%	1.64
Virtual Realities (Second Life,etc.)	169	58%	32%	10%	1.52
Wikis	170	63%	28%	9%	1.46
Video Conferencing	172	52%	31%	17%	1.66
Database Software	171	27%	43%	30%	2.03
Desktop Publishing Software	174	12%	44%	44%	2.32
Presentation Software	170	10%	41%	49%	2.39
Spreadsheet Software	169	26%	41%	33%	2.07
Web Authoring Software	165	41%	38%	21%	1.79
Word Processing Software	170	9%	31%	59%	2.5
Audio Editing Software	168	47%	33%	20%	1.73
Concept Mapping Software	173	39%	37%	24%	1.84
Draw/Paint Software	171	40%	44%	16%	1.76
Image Editing Software	171	37%	46%	17%	1.8
Video Editing Software	171	43%	41%	16%	1.73
Educational Software	170	15%	31%	54%	2.39